J. Oliver — 1797

AN

INTRODUCTION

TO

BOTANY,

IN

A SERIES OF

FAMILIAR LETTERS,

WITH ILLUSTRATIVE ENGRAVINGS.

BY PRISCILLA WAKEFIELD,

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PREFACE.

THE design of the following Introduction to Botany, is to cultivate a taste in young persons for the study of nature, which is the most familiar means of introducing suitable ideas of the attributes of the Divine Being, by exemplifying them in the order and harmony of the visible creation. Children are endowed with curiosity and activity, for the purpose of acquiring knowledge. Let us avail ourselves of these natural propensities, and direct them to the pursuit of the most judicious objects: none can be better adapted to instruct, and at the same time amuse, than the beauties of nature, by which they are continually surrounded. The structure of a feather

or

or a flower is more likely to impreſs their minds with a juſt notion of Infinite Power and Wiſdom, than the moſt profound diſcourſes on ſuch abſtract ſubjects, as are beyond the limits of their capacity to comprehend. In the important buſineſs of forming the human mind, the inclination and pleaſure of the pupil ſhould be conſulted; in order to render leſſons effectual, they ſhould pleaſe, and be ſought rather as indulgencies, than avoided as laborious toils. Botany is a branch of Natural Hiſtory that poſſeſſes many advantages; it contributes to health of body and cheerfulneſs of diſpoſition, by preſenting an inducement to take air and exerciſe; it is adapted to the ſimpleſt capacity, and the objects of its inveſtigation offer themſelves without expence or difficulty, which renders them attainable to every rank in life; but with all theſe allurements, till of late years, it has been confined to the circle of the learned, which may be attributed to thoſe books that treat of it, being principally written

written in Latin; a difficulty that deterred many, particularly the female ſex, from attempting to obain the knowledge of a ſcience, thus defended, as it were, from their approach. Much is due to thoſe of our own countrymen, who firſt introduced this delightful volume of nature to popular notice, by preſenting it in our native language; their labours have been a means of rendering it very generally ſtudied, and it is now conſidered as a neceſſary addition to an accompliſhed education.—May it become a ſubſtitute for ſome of the trifling, not to ſay pernicious, objects, that too frequently occupy the leiſure of young ladies of faſhionable manners. and, by employing their faculties rationally, act as an antidote to levity and idleneſs. As there are many admirable Engliſh books now extant upon the ſubject, it may require ſome apology for obtruding the preſent work upon the public. It appeared that every thing hitherto publiſhed, was too expenſive, as well as too diffuſe and ſcientific,

tific, for the purpoſe of teaching the elementary parts to children or young perſons; it was therefore thought, that a book of a moderate price, and diveſted as much as poſſible of technical terms, introduced in an eaſy familiar form, might be acceptable.

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AN

INTRODUCTION

TO

BOTANY.

LETTER I.

FELICIA TO CONSTANCE.

DEAR SISTER, *Shrubbery, February* 1.

AS it is an unuſual thing for us to be ſeparated, I do not doubt, but we equally feel the pain of being at a diſtance from each other; when I conſider, that you are really gone to paſs the whole ſummer with my aunt, and that I have parted with the beloved companion of my walks and amuſements, I think I ſhall but half enjoy either, during the fine ſeaſon that is approaching. With you, indeed, the caſe will be rather different; new ſcenes will preſent themſelves, which will entertain by their novelty and variety, and the kind attentions of my aunt and couſins will compenſate in a degree for the ab-

ſence of thoſe friends you have left at home. Every place here looks ſolitary, eſpecially our own apartment, and our favourite haunts in the garden. Even the approach of ſpring, which is marked by the appearances of ſnow drops and crocuſſes, affords me but little pleaſure; my kind mother, ever attentive to my happineſs, concurs with my governeſs in checking this depreſſion of ſpirits, and inſiſts upon my having recourſe to ſome intereſting employment that ſhall amuſe me, and paſs away the time while you are abſent; my fondneſs for flowers has induced my mother to propoſe Botany, as ſhe thinks it will be beneficial to my health, as well as agreeable, by exciting me to uſe more air and exerciſe than I ſhould do, without ſuch a motive; becauſe books ſhould not be depended upon alone, recourſe muſt be had to the natural ſpecimens growing in fields and gardens; how ſhould I enjoy this purſuit in your company, my dear ſiſter! but as that is impoſſible at preſent, I will adopt the neareſt ſubſtitute I can obtain, by communicating to you the reſult of every leſſon. You may compare my deſcriptions with the flowers themſeles, and, by thus mutually purſuing the ſame object, we may reciprocally improve each other. I am impatient to make a beginning, but am full of apprehenſion of the number of hard words at the entrance. However

ever, I am reſolved not to be deterred by this difficulty; perſeverance and patience will overcome it; and as I know the eaſy method of inſtruction adopted by my dear governeſs in other ſciences, I confide in her ſkill to render this eaſy and pleaſant.

FELICIA.

LETTER II.

Shrubbery, February 10.

THE morning being fine tempted us abroad. Botany ſupplied us with ſubjects for converſation. Mrs. Snelgrove took the opportunity of remarking, that a perfect plant conſiſts of the root, the trunk or ſtem, the leaves, the ſupports, flower, and fruit; (for botanically ſpeaking) by fruit in herbs, as well as in trees, is underſtood the whole formation of the ſeed: and as each part needs a particular explanation to a novice, ſhe began her lecture by pointing out the uſes of the root. The firſt, and moſt obvious, is that of enabling the plant to ſtand firmly in the

ground, by ſerving as a balance to the head. By what means could the enormous oaks in the park be kept upright and fixed, but by their extenſive turgid roots, that ſerve as a counterpoiſe againſt the weight of the trunk and branches. The chief nouriſhment of the plant is received by the radicle, or fibrous part of the roots, that, like ſo many mouths, abſorb the nutricious juices from the earth. The root alſo performs the part of a parent, by preſerving the embryo plants in its boſom, during the ſeverity of winter, in form of bulbs or buds: bulbs are properly but large buds, eyes, or germs, including the future plants. Nature is an œconomiſt, and is ſparing of this curious proviſion, againſt the cold, where it is unneceſſary. In warm countries, few plants are furniſhed with winter buds. Roots are diſtinguiſhed by different names, according to their forms; as fibrous bulbous, and tuberous, with many other leſſer diſtinctions, expreſſive of their manner of growth.

The next part of a plant, that claims our notice, is the trunk or ſtem, that riſes out of the root, and ſupports the flower, leaves, &c. The trunk of trees and ſhrubs, (and it is ſuppoſed, that the ſtem of the more diminutive kinds of plants, in the ſame manner) conſiſts of ſeveral diſtinct parts; as the bark, the wood, the ſap-veſſels, correſponding to the blood-veſſels in animals; the

the pith, the tracheæ or air veſicles, and the web or tiſſue; each of theſe parts has its peculiar uſe, and its conſtruction is admirably adapted to its purpoſe. The bark of plants ſeems to perform the ſame offices to them, that the ſkin does to animals; it clothes and defends them from injury, inhales the moiſture of the air, and extracts, or conveys from the plant the ſuperfluity of moiſt particles. The cauſe of evergreens retaining their foliage during the winter, is ſuppoſed to ariſe from an abundant quantity of oil in their barks, which preſerves them from the effects of cold. The bark (as well as the wood) is ſupplied with innumerable veſſels, which convey the fluids to and from every part of the plant; the wood alſo is furniſhed with others, which contain air, and is diſtributed throughout its ſubſtance. The ſtability of trees and ſhrubs conſiſts in the wood, which correſponds with the bones of animals. The ſeat of life ſeems to reſide in the pith or medullary ſubſtance, which is a fine tiſſue of veſſels originating in the centre. The fluids of plants are the ſap, analogous to the blood of animals; and the proper juice, which is of various colours and ſubſtance in different individuals; as white or milky in the dandelion, reſinous in the fir, and producing gum in the cherry or plum trees, &c. Hoping that I have given you ſuch a clear deſcription of the

root and ſtem, as will enable you to form a general idea of their parts and uſes, I ſhall proceed to the leaves, which contribute, at the ſame time, to the benefit and ornament of the plant. I need not tell you, that the variety of their forms and manner of growth is great; your own obſervation has long ſince informed you of this particular, and prepared you to underſtand the terms by which botaniſts arrange them, according to their forms and ſhapes; as ſimple, compound, rough, ſmooth, round, oval, heart ſhaped, &c. theſe minutiæ muſt be learned by referring to plates. Leaves are ſuppoſed to anſwer the purpoſe of lungs, and, by their inclination to be moved by the wind, in ſome degree, ſerve alſo thoſe of muſcles and muſcular motions. They are very porous on both their ſurfaces, and inhale and exhale freely. The annual ſun-flower is an extraordinary inſtance of this fact; it is ſaid to perſpire nineteen times as much as a man, in twenty-four hours. Fine weather encourages the perſpiration of vegetables; but in heavy, moiſt, and wet weather, the inhalation exceeds. The effluvia of plants is thought unwholeſome to perſons of delicate conſtitutions, but particularly ſo at night and in a dull ſtate of the atmoſphere; but it is worth obſerving that the air emitted from the leaves is never prejudicial; that which is noxious proceeds from the corollas only.

The

The next parts to be conſidered, are the ſupports or props; by theſe are meant certain external parts of plants, which are uſeful to ſupport and defend them from enemies and injuries, or for the ſecretion of ſome fluid, that is baneful or diſagreeable to thoſe inſects that would otherwiſe hurt them. They are divided into ſeven kinds: 1ſt, Tendrils; ſmall ſpiral ſtrings, by which ſome plants, that are not ſtrong enough to ſtand alone, ſuſtain themſelves by embracing trees, ſhrubs, or other ſupports; the honeyſuckle and bindweed afford examples of this. 2dly, Floral leaves; are ſmall leaves placed near the flower, ſmaller, and moſtly of a different form from thoſe of the plant. 3dly, Scales; ſmall leafy appendages, ſituated on either ſide, or a little below the leaf, to protect it, when firſt emerging from the bud. 4thly, Foot ſtalks; theſe ſupport the leaf, and defend and convey nouriſhment to the infant bud. 5thly, Flower ſtalk, or foot ſtalks, to the flower and fruit. 6thly, Arms; a general term for the offenſive parts of plants, ſuch as thorns, prickles, ſtings, &c. 7thly, Pubes; a name applied to the defenſive parts of plants, ſuch as hairs, wool, a certain hoary whiteneſs, hooks, briſtles, glands, clammineſs, and viſcidity. In order to enliven a dry detail of names, and a mere deſcription of parts, Mrs. Snelgrove favoured me with an account

of ſome curious contrivances of nature, obſerved in ſome particular plants, for their defence againſt inſects, or larger animals, that would, without this precaution, greatly annoy them; and as I know the pleaſure you take in ſuch recitals, I ſhall repeat them to you, before I cloſe this long letter. The viſcous matter, which ſurrounds the ſtalks, under the flowers of the catchfly, prevents various inſects from plundering the honey, or devouring the pollen, which fertilizes the ſeed. In the dionæa muſcipula, or Venus's fly-trap, there is a ſtill more wonderful means of preventing the depredations of inſects. The leaves are armed with long teeth, like the antenna of inſects, and lie ſpread upon the ground round the ſtem; they are ſo irritable, that when an inſect creeps upon them, they fold up, and cruſh or pierce it to death. The flower of the arum muſcivorum has the ſmell of carrion, which invites the flies to lay their eggs in the chamber of the flower; but the worms, which are hatched from theſe eggs, are unable to make their eſcape from their priſon, being prevented by the hairs pointing inwards, which has given the name of fly-eater to this flower. The ſame purpoſe is effected in the dypſacus, vulgarly called teazel, by a baſon or receptacle of water, placed round each joint of the ſtem.

The

The nauſeous and pungent juices of ſome vegetables, and the fragrance of others are beſtowed upon them in common with thorns and prickles for their defence againſt the depredations of animals. Many trees and ſhrubs ſupply grateful food to a variety of creatures, and would be quickly devoured, were they not armed with thorns and ſtings, which protect them not only againſt ſome kinds of inſects, but alſo againſt the naked mouths of quadrupeds. It is worth remarking, as a farther analogy between plants and animals, that the former frequently loſe their thorns, &c. by cultivation, as wild animals are deprived of their ferocity, by living in a domeſtic ſtate, under the government and protection of man. My letter is already ſpun out to a tedious length, I muſt, therefore, reſerve the deſcription of the fructification till a future opportunity.—Adieu: your

FELICIA.

LETTER III.

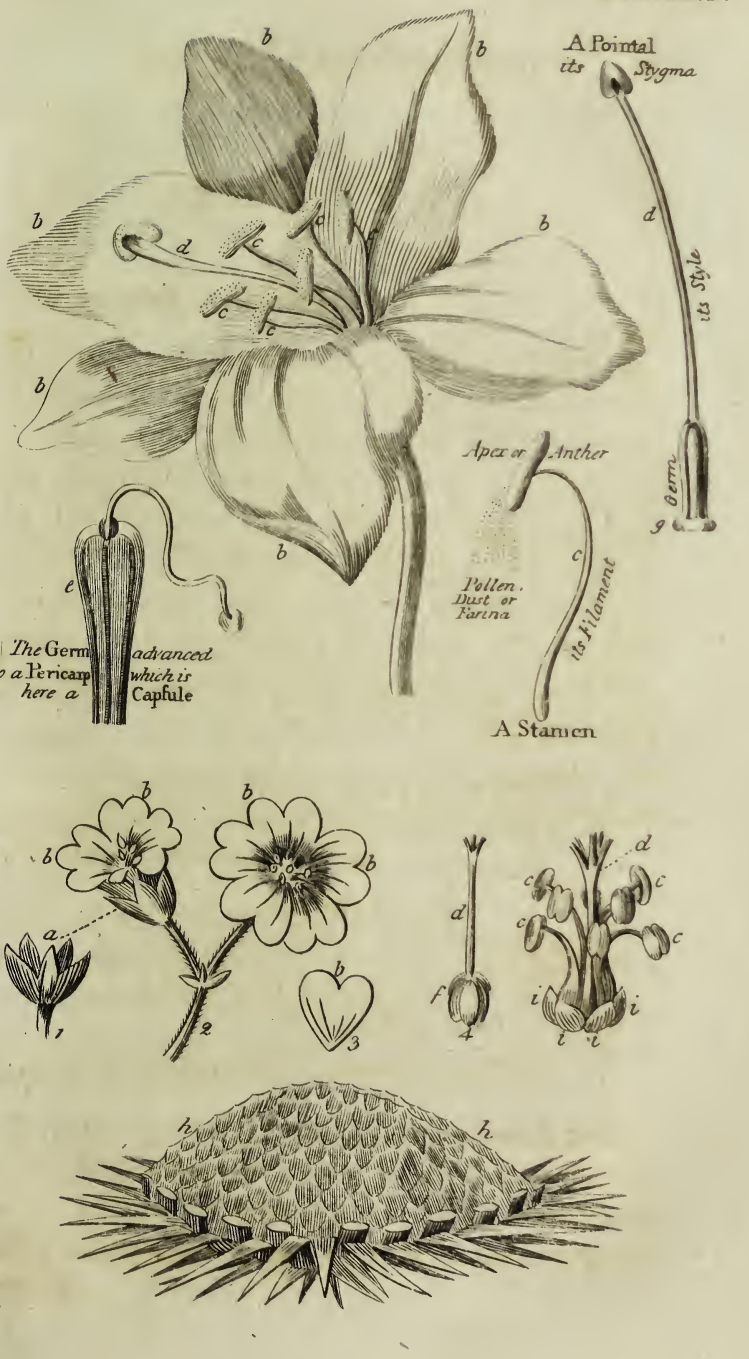
Shrubbery, February 18.

THE approbation you expreſs, my dear Conſtance, of my endeavours to amuſe you with an account of my botanical lectures, encourages me to proceed, though with great diffidence, as I find the ſubjects become more intricate as I advance. The fructification includes the flower and fruit, and contains the whole proceſs of perfecting the ſeeds. It conſiſts of ſeven parts; and to illuſtrate them, I have ſketched ſome particulars from the lily, &c.

1. The (calyx) cup, or empalement, *a*.
2. The (corolla) bloſſom, petals, or flower-leaves, *b*.
3. The (ſtamina) threads or chives, *c*.
4. The (piſtillum) ſtyle or pointal, *d*.
5. The (pericarpium) ſeed veſſel, *e*.
6. The ſeed or fruit, *f*.
7. The (receptaculum) receptacle, or baſe, *g*.

Some flowers poſſeſs all theſe parts, others are deficient in ſome of them; but the chives or the pointals, or both, are eſſential, and to be found in all, either in flowers on the ſame plant, or in different

PLATE. 1.


A Pointal
its Stygma
its Style
Germ
Apex or Anther
Pollen. Dust or Farina
its Filament
A Stamen
The Germ advanced to a Pericarp which is here a Capsule

different individual flowers of the ſame ſpecies, on ſeparate plants. I ſhall give you as clear a deſcription of theſe ſeveral parts as I poſſibly can, to enable you to diſtinguiſh them at firſt ſight. The cup, empalement or calyx (*a*) is that outer part of the flower, formed of one or more green, or yellowiſh green leaves, ſuſtaining the corolla at the bottom, and encloſing it entirely, before it expands, as you may remark in the Roſe or Geranium, the latter of which I have ſketched for an illuſtration. The empalement is either

A cup, as in the polyanthus,
A fence, as in the hemlock or carrot,
A catkin, as in the willow or hazel,
A ſheath, as in the narciſſus,
A huſk, as in oats, wheat, or graſſes,
A veil, as in moſſes,
A cap, as in muſhrooms.

The bloſſom, petals, or corolla (*b*), is that beautiful coloured part of a flower, which firſt draws the attention, and is regarded by common eyes as the flower itſelf; but botaniſts, more ſtrict in their definitions, appropriate that term to the compoſition of the whole of the fructification, of which the corolla is only a part.

The threads, or chives, are compoſed of two parts; one long and thin, by which they are faſtened

faſtened to the bottom of the corolla, called the filament; the other thicker, placed at the top of the filament, called anthera, or anther. Each anther is a kind of box, which opens when it is ripe, and throws out a yellow duſt which has a ſtrong ſmell; this is termed pollen or farina, and is the ſubſtance of which bees are ſuppoſed to make their wax. The progreſs of the ſeed to maturity is deſerving the moſt curious attention. Firſt, the calyx opens, then the corolla expands and diſcovers the ſtamens, which generally form a circle within the petals, ſurrounding the pointal. The pollen or duſt, which burſts from the anthers, is abſorbed by the pointal, and paſſing through the ſtyle, reaches the germ, and vivifies the ſeed, which without this proceſs would be imperfect and barren. The ſtamens, pointal, and corolla, having performed their reſpective offices, decline and wither, making room for the ſeed-bud, which daily increaſes, till it attain its perfect ſtate. Many curious experiments have been made by attentive naturaliſts, that prove the neceſſity of this communication between the ſtamens and pointals of the ſame flower, in order to render its ſeeds productive. The ſtamens and pointal being ſometimes diſpoſed on different plants, the trial may be made by ſhutting up a pot of thoſe which have pointals only, in ſome place where they cannot be reached by the pollen

pollen of the ſtamens of other individual plants, and experiment has conſtantly ſhown, that no ſeed is produced in this ſituation; but how ſhall we account for the conveyance of the pollen from one plant to another, growing at a diſtance from it? They are both fixed, and cannot approach each other; yet nature, ever abounding in reſources, has provided ſufficient means for the purpoſe. It is probable that there is an attraction between them, which we may imagine, but cannot perceive; this attractive quality may draw the pollen, floating about in the air, as it is wafted by the winds, to the pointals of its own ſpecies; or, in many caſes, the numerous tribes of minute winged inſects, which we obſerve ſo buſily employed in a warm day, baſking and hovering upon the flowers, may ſoon convey this fertilizing duſt from one to another, and, whilſt they are feaſting upon the delicious honey afforded by theſe flowers, return the favour, by rendering them an eſſential ſervice.

The ſtyle, pointal, or piſtil, is compoſed of three parts (Plate I.): the germen, the ſtyle, and the ſtigma. The germen varies, as to its form, in different plants, but is always placed below the ſtyle; its office is to contain the embryo ſeeds. The ſtyle is placed on the germen, and is of a variety of figures and lengths, and ſometimes ſeems wholly wanting. The ſtigma alſo appears

appears of different forms, but always retains the ſame ſituation, being invariably placed at the top of the ſtyle; or, if that be wanting, it is fixed on the germen.

The ſeed veſſel, or pericarpium, is the germen of the piſtil enlarged, as the ſeeds increaſe in ſize, and approach nearer perfection. (Plate I.) The ſeed veſſel is divided into ſeven kinds:

Capſule, as in poppy and convolvulus,
Pod, as in wallflower and honeſty,
Shell, as in pea and broom,
Berry, as in elder and gooſeberry,
Fleſhy, as in apple and pear,
Pulpy, as in cherry and peach,
Cone, as in fir and pine.

The ſeeds, or fruit, reſemble the eggs of animals, and are the eſſence of the fruit, containing the rudiments of a new vegetable. The formation of the ſeed is variouſly adapted to its purpoſe, and is compoſed of ſeveral parts: 1ſt, The heart; this is the principle of life in the future plant, contained within the lobes; it conſiſts of two parts, the plume, which aſcends, and forms the futurn ſtem; and the beak which deſcends and becomes the root. 2dly, The ſide lobes; theſe ſupply the heart of the ſeed with nouriſhment, till it is capable of extracting ſupport from the

the earth. In moſt plants the lobes aſcend in the form of leaves, and are called ſeed or radicle leaves; but, in ſome, they periſh beneath the ſurface, without appearing above ground. 3dly, The Scar; is an external mark, where the ſeed was faſtened within the ſeed veſſel. 4thly, The ſeed-coat is a proper cover to ſome ſeeds. It is of various texture and conſiſtence in different individuals. Sometimes the ſeed is crowned with the cup of the flower, and ſometimes it is winged with a feather, or with a thin expanded membrane, which aſſiſts the wind to waft or diſperſe it to a diſtance. The ſeed contains the perfect plant in embryo, though, in moſt inſtances, too minute to be diſcerned by our organs of ſight; but if the ſeed of a bean or an acorn be ſufficiently ſoaked in warm water, the form of the future plant may be plainly perceived.

The baſe, or receptacle (*g*), is that part by which the whole fructification is ſupported; in many flowers it is not very ſtriking, but in others it is large and remarkable, as in the cotton thiſtle (*b*). The artichoke will alſo furniſh us with an example: take away the empalement, bloſſoms, and briſtly ſubſtances, and the part remaining is the receptacle, which we eat, and call the bottom.

It

It remains for me to deſcribe the nectarium, nectary, or honey cup, an appendage with which ſome flowers are furniſhed, containing a ſmall quantity of ſweet honey-like juice, from which the bees collect their rich treaſures. It is very conſpicuous in ſome flowers, as the naſturtium, crown imperial, columbine, and larkſpur; but leſs viſible in others, and in ſome, appears to be entirely wanting. In the dove-footed cranes-bill, there are five yellowiſh glands (*i*), which ſerve as nectary. The uſe is ſuppoſed to be that of a reſervoir, for the nouriſhment of the tender ſeed bud.

I am fearful, my dear ſiſter, that you are fatigued with theſe tedious definitions and deſcriptions of parts; to me they have been rendered more agreeable, as I have become acquainted with them from viſible objects. I hope to participate this pleaſure with you in degree, by exemplifying them in ſome individual flowers, which you may examine by yourſelf; but I ſhall defer this till my next letter, and conclude affectionately yours,

FELICIA.

LETTER

LETTER IV.

Shrubbery, February 24.

THE further I advance in my new ſtudy, the more pleaſure I take in it, and ſhould value it as an important addition to the number of my innocent enjoyments, if partaken with you, my beloved Conſtance. Though far ſeparated from each other, I am ſtill deſirous of aſſociating with you, as much as the mode of communication will permit, in the delight I feel in examining pointals and ſtamens. My morning and evening rambles are devoted to this purſuit, nor will Mrs. Snelgrove permit me to paſs theſe hours in mere amuſement, but leads me by her amiable reflections to conſider theſe pleaſing objects not only in a botanical view, but by pointing out the peculiar uſes of the different parts of their ſtructure, to perceive and admire the proofs of Divine Wiſdom exhibited in every leaf, and in every flower; common beholders ſee theſe things conſtantly without obſerving them; how happy am I to have an inſtructreſs and guide, who teaches me to uſe my eyes, and exert thoſe faculties which nature has beſtowed upon me! The flowers which I have ſelected as examples,

for

for your examination, to render you perfect miſtreſs of the parts, are the Crown Imperial, the Stock Gilliflower, and the Pea; the laſt, is choſen on account of the wonderful means uſed in its conſtruction, for the preſervation of thoſe parts, neceſſary to perfect the fruit or ſeed. They are not yet in ſeaſon. The firſt will ſoon appear, but you muſt wait patiently for the others, till the time of their blooming arrives, which will afford you the advantage of watching their progreſs from the firſt appearance of the bud, to the perfecting the ſeeds; nor can you judge accurately of ſeveral of the parts, but by this daily examination, as they change their form and appearance in different ſtages of the maturity of the flower. Gather a crown imperial, as ſoon as you perceive one blown; if you obſerve it cloſely, you will find that it has no cup or empalement; pull off the beautifully coloured ſcarlet, or ſometimes yellow, petals, which form the corolla, one by one, and you will find that there are ſix of them. The corollas of many flowers are formed of one petal, as the Canterbury Bell, and are, on that account, called Monopetalous. But thoſe that have more petals than one in their corollas, are termed Polypetalous. Obſerve a ſort of little column, riſing exactly in the middle of the corolla, and pointing upwards. This taken in its whole, is the pointal, but by a nice

nice inſpection, you will find it divided into three parts: The oblong, three cornered, ſwollen baſe, which is the germ or ovary, the ſtyle or thread placed upon this, crowned by the ſtigma with three notches. Between the pointal and the corolla, ſix other bodies will claim your notice, which you will readily gueſs are the ſtamens, compoſed of filaments and anthers. Continue your viſits to ſome other individual flower of the ſame kind, till the petals wither and fall off, and you will perceive that the germ increaſes, and becomes an oblong triangular capſule, within which are flat ſeeds in three ſhells. Behold the pericarp under the form of this capſule. I had like to have forgotten to mention the honey-cup, which may be found at the bottom of the petals, in the form of a little hole. The willow wren creeps up the ſtem of this plant, and ſips the drops of honey as they hang from the petals. After having carried you through the various parts of a Crown Imperial, I will introduce a Stock Gilliflower to your acquaintance, which, I hope, will afford you as much entertainment as the flower already examined. It is neceſſary that I ſhould remark, that our ſtock muſt be a ſingle one. Thoſe fine purple double ſtocks that we prized ſo highly laſt ſummer, would have been totally diſregarded by a botanical ſtudent, who conſiders all

double flowers, either as the ſport of nature, or the effect of art, and conſequently improper for his inveſtigation. In the examination of this flower, the firſt thing that you will ſee is the calyx, an exterior part, which was wanting in the Crown Imperial. In the ſtock, it conſiſts of four pieces, which we muſt call leaves, leaflets, or folioles, having no proper name to expreſs them by, as we have of petals for the pieces that compoſe the corolla. Theſe leaflets are commonly unequal by pairs. That is, there are two oppoſite and equal, of a ſmaller ſize, and two others alſo oppoſite and equal, but larger. This calyx contains a corolla, compoſed of four petals. I ſay nothing of their colour, becauſe that makes no permanent part of their character. Each of theſe petals is faſtened to the receptacle, or bottom of the calyx, by a narrow pale part, called the claw of the petal, and this ſpreads out over the top of the calyx, into a large, flat, coloured piece, diſtinguiſhed by the name of lamina, or the border. Admire the regularity of the corolla of the flowers of this tribe. The petals grow generally wide of each other, and exactly oppoſite to one another, forming a figure reſembling that of a croſs, which has given them the name of cruciform, or croſs-ſhaped. The petals of the corolla, and the leaflets of the calyx are ſituated alternately; and this poſition prevails in all flowers,

ſtowers, in which is a correſpondent number of petals and leaflets. In the centre of the corolla is one piſtil or pointal, long and cylindric, chiefly compoſed of a germ, ending in a very ſhort ſtyle, and that terminated by an oblong ſtigma, which is bifid, or divided into two parts, that are bent back on each ſide. It remains now to ſpeak of the ſtamens; there are ſix of them, two, ſhorter than the other four, oppoſite to each other, theſe are ſeparated by the reſt, as are alſo the others in pairs. When the corolla withers, the germ grows conſiderably in length, and thickens a little as the fruit ripens; when it is ripe, it becomes a kind of flat pod, called ſilique. This ſilique is compoſed of two valves, each covering a ſmall cell, and theſe cells are divided by a thin partition. When the ſeeds are ripe, the valves open from the bottom upwards, to give them paſſage, and remain faſt to the ſtigma at top. Then you may diſcover the flat round ſeeds ranged along each ſide of the partition, and you will find that they are faſtened alternately, to right and left, by a ſhort pedicle, or footſtalk, to the ſutures or edges of the partition. The great number of ſpecies in this claſs, has determined botaniſts to divide it into two ſections, in which the flowers are perfectly alike; but there is a material difference in the fruits, pericarps, or ſeed veſſels. The deſcription

of

of the Pea, will enlarge my letter to an unreaſonable length, and as I am tired, and ſuppoſe that you muſt be ſo likewiſe, I will defer it to my next. Adieu, dear ſiſter; ſay every thing for me, to my aunt and couſins, that is kind and affectionate, and believe me ever your.

FELICIA.

LETTER V.

Shrubbery, March 1.

IT is with renewed pleaſure I devote the preſent half hour to your ſervice, ſince you aſſure me, that my letters contribute to your amuſement, and that you purſue the ſame object, that occupies me daily, from the hints I have given you. I wiſh you had a better guide, that could ſatisfy your enquiries, and animate your induſtry by ſuperior ſkill; affection and a deſire to pleaſe, will ſtimulate me to repeat Mrs. Snelgrove's lectures accurately: I wiſh I may be able to give you a clear idea of what I deſcribe; but I find it difficult to expreſs forms and ſhapes by writing.

writing. I believe I ſhall be obliged to have frequent recourſe to my pencil, which will repreſent in a more lively manner the pleaſing objects of our preſent reſearches. In order to aſſiſt you in the examination of the minute parts of ſmall flowers, it will be neceſſary to provide a magnifying glaſs, a needle, lancet, and a pair of ſmall ſciſſars, to render the diſſecting them eaſier; for many of their parts are too delicate to be handled, for which reaſon a pair of ſmall nippers will be an uſeful addition to the inſtruments, that Is have already named. Although I have wandered far from the ſubject, I have not forgotten my promiſe, of deſcribing the curious mechaniſm employed in the ſtructure of the pea flower.

On examining this elegant and wonderful bloſſom, you will obſerve that the calyx is of one piece, divided at the edge into five ſegments, or diſtinct points, two of which are wider than the other three, and are ſituated on the upper ſide of the calyx, whilſt the three narower ones occupy the lower part. The corolla is compoſed of four petals, the firſt is broad and large, covering the others, and ſtanding as it were, on the upper part of the corolla, to defend and ſhelter it from the injuries of the weather, in the manner of a ſhield; by way of pre-eminence, it is called the Standard, or Banner. In taking off the ſtandard, remark how deeply it is inſerted on

each

each ſide, that it may not be eaſily driven out of its place by the wind. The ſide petals, diſtinguiſhed by the name of wings, are expoſed to view by taking off the banner. They are as uſeful in protecting the ſides of the flower, as the banner is in covering the whole. Take off the wings, and you will perceive the keel, called ſo on account of its fancied reſemblance to the ſhape of the bottom of a boat; this incloſes and preſerves the centre of the flower from harm, which its delicate texture might receive from air and water. If you are curious to examine the contents of this little caſket, ſlip the keel gently down, and you will diſcover a membrane, terminated by ten diſtinct threads, which ſurround the germ, or embryo of the legume or pod. Each of theſe threads or filaments is tipped with a yellow anther, the farina of which covers the ſtigma, which terminates the ſtyle, or grows along the ſide of it. The filaments form an additional defence to the germ, from external injuries. As the other parts decay and fall off, the germ gradually becomes a legume or pod. This legume is diſtinguiſhed from the ſilique of the cruciform tribe, by the ſeeds being faſtened to one ſide only of the caſe or ſhell, though alternately to each valve of it. Compare the pod of a pea and ſtalk together, and you will immediately perceive the difference. The footſtalk

which

which ſupports this flower is ſlender, and eaſily moved by the wind. In wet and ſtormy weather, the pea turns its back to the ſtorm, whilſt the banner infolds the wings, by cloſing about them, and partly covers them; they perform the ſame office to the keel; containing the eſſential parts of the fructification. Thus is this flower curiouſly ſheltered and defended from its natural enemies, rain and wind; and, when the ſtorm is over, and fair weather returns, the flower changes its poſition; as if ſenſible of the alteration, expands its wings, and erects its ſtandard as before. Wonderful are the means of preſervation uſed by the all-wiſe Creator to defend the tender and important parts of the fructification of the plants from injury; but he ſeems to have provided in an eſpecial manner, for the ſecurity of thoſe, which ſerve as nouriſhment to men and animals, as does the greater part of the leguminous or pulſe kind. I imagine by this time, that you are pretty well acquainted with ſeveral parts that compoſe a flower, and would recogniſe them, though in an individual that was an utter ſtranger to you. Confirm your knowledge by practice, and do not ſuffer a day to paſs without amuſing yourſelf in diſſecting ſome flower or other. When you are perfectly acquainted with this entrance of the ſcience, Mrs. Snelgrove ſays, that I may proceed to give you a

ſketch of the arrangement and claſſification of plants, for it is by method only, that it is poſſible to obtain a knowledge of ſo many particulars. Botany would be indeed a moſt fatiguing and almoſt unattainable ſcience, were we obliged to learn the peculiarities of every plant, one by one; but the difficulty ceaſes, or at leaſt is greatly diminiſhed, by claſſing thoſe together, in which there is a ſimilarity in ſome one point. Eminent naturaliſts have at different times exerted their talents to perform this taſk. Tournefort is a name that was highly diſtinguiſhed on this liſt, before the time of Linnæus, whoſe ſuperior genius has raiſed him above all his predeceſſors: his ſyſtem is now univerſally adopted. As it will furniſh matter for ſeveral letters, I ſhall not enlarge upon it at this time, but proceed to relate ſome anecdotes concerning this great man, that I think likely to afford you entertainment. Charles Linnæus was a native of Sweden, and the ſon of an obſcure clergyman in that country: his father was a great admirer of the vegetable productions of nature, and adorned the environs of his rural manſion with the natural produce of the neighbouring fields. Young Linnæus caught the enthuſiaſm, and early imbibed the ſame taſte, with ſuch warmth, that he was never able to bend his mind to any other purſuit. His father intended to bring him up to the church, but he ſhewed

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ſuch a diſlike to theological ſtudies, to which his nature was averſe, that his relations, angry and diſappointed at his want of application, by way of puniſhment, purpoſed to bind him apprentice to a ſhoe-maker; but an over-ruling Providence deſtined him to fill a more noble and diſtinguiſhed walk in life. A phyſician, named Rothman, obſerving him to be a lad of genius, compaſſionated his ſituation, and relieved him from it, by taking him into his own family, and inſtructing him in the ſcience of medicine. By accident he lent him Tournefort's Elements of Botany to read, which renewed his former taſte for the productions of Flora, and decided the caſt of his future character. From that time he devoted all his leiſure to his favourite ſtudy, and by the luſtre of his abilities, drew the attention of ſome of the moſt learned men in Europe, who encouraged and patroniſed him in the proſecution of that amiable and intereſting purſuit, to which he had devoted himſelf. Botany was in an imperfect ſtate, when he undertook to form a new ſyſtem, which he effected ſo excellently, that it has immortaliſed his name, and although it may probably receive improvement from ſome future naturaliſt, it is never likely to be ſuperſeded. The ſtudies of Linnæus were not wholly confined to botany. He formed the preſent claſſification of moſt other branches of

natural hiſtory, and, by his judicious arrangements, has rendered the acquiſition of the knowledge of nature eaſier to the ſtudent, than it was before his ſyſtem was invented. It is late, and I am obliged to lay aſide my pen.—Farewell.

FELICIA.

LETTER VI.

DEAR SISTER, *Shrubbery, March 6.*

I AM fearful, leſt by this time, you are wearied with the minute deſcriptions of the ſeparate parts of flowers and plants, and that you begin to wiſh for ſomething more amuſing. Botany, like all other ſciences, has its elements, which muſt be patiently learned by the pupil, before ſufficient knowledge can be attained, to enjoy the moſt pleaſing parts of it. I have already hinted the neceſſity of forming ſome ſyſtem, that may reduce the innumerable individuals of the vegetable kingdom, to the compaſs of human memory and comprehenſion. All the known vegetable productions, upon the ſurface

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of the globe, have been reduced by naturaliſts to Claſſes, Orders, Genera, Species, and Varieties. The Claſſes are compoſed of Orders; the Orders are compoſed of Genera; the Genera of Species; and the Species of Varieties. Let us endeavour to attain a clearer idea of Claſſes, Orders, &c. by comparing them with the general diviſions of the inhabitants of the earth.

Vegetables reſemble Man,
Claſſes Nations of Men,
Orders, Tribes, or Diviſions of Nations,
Genera, the Families that compoſe the Tribes,
Species, Individuals of which families conſiſt,
Varieties, Individuals under different appearances.

Do not think, dear ſiſter, that I am capable of methodiſing ſo accurately, without the kind aſſiſtance of one, who ſuperintends my letters, and points out what I ſhould write; it is not neceſſary to ſay, that Mrs. Snelgrove is that attentive affectionate friend, who will not allow me to do any thing without ſome degree of regularity. Many great men, as I told you in my laſt, have formed ſyſtems after different plans. Thoſe of Tournefort and Linnæus are moſt eſteemed; both are ingenious: but as that of Linnæus has ſuperſeded all others, it will not be

neceſſary to confound your memory with any other, his being the one univerſally adopted; it is that in which it is proper to be completely inſtructed.

Linnæus, diſſatisfied with every ſyſtem invented before his time, undertook to form a new one, upon a plan approaching nearer to perfection, and depending on parts leſs liable to variation. The ſtamens and pointals are the baſis of his claſſification. He has divided all vegetables into twenty-four claſſes. Theſe claſſes are ſubdivided into nearly one hundred orders; theſe orders include about two thouſand families or genera; and theſe families about twenty thouſand ſpecies, beſides the innumerable varieties produced by the accidental changes of cultivation, ſoil, and climate. As you have acquired accurate notions of ſtamens and piſtils, you will find but little difficulty in making yourſelf miſtreſs of the claſſes and orders; the former depending principally upon the number, the length, the connection, or the ſituations of the ſtamens; the latter are diſtinguiſhed by the number, or other circumſtances of the pointals. The characters of the genera are marked from ſome particulars in the flower, unnoticed in the definitions of the claſſes or orders. The generic deſcription includes *all* the moſt obvious appearances in the flower. In a ſcience depending ſo much on memory, and minute

minute definitions, it is adviſable to proceed ſtep by ſtep, and make yourſelf perfectly acquainted with the claſſes, before you advance to the orders. Should you gather a flower, in order to know to what claſs it belongs, obſerve firſt, whether it be a perfect flower, containing both ſtamens and pointals; if that be the caſe, examine whether the ſtamens are entirely ſeparate from the pointal, and each other, from top to bottom. If you find that they are perfectly diſtinct, and of equal height when at maturity, and not ſo many as twenty, the number of them alone will be ſufficient to determine the claſs.

Thoſe that have one ſtamen will belong to the firſt claſs, Monandria.

Thoſe that have two, to the ſecond, Diandria.

Thoſe that have three, to the third, Triandria.

Thoſe that have four, to the fourth, Tetrandria.

Thoſe that have five, to the fifth, Pentandria.

Thoſe that have ſix, to the ſixth, Hexandria.

Thoſe that have ſeven, to the ſeventh Heptandria.

Thoſe that have eight, to the eighth, Octandria.

Thoſe that have nine, to the ninth, Enneandria.

Thoſe that have ten, to the tenth, Decandria.

Thus far, it is easy to arrange each flower under its proper class, as you have nothing farther to do, but observe the four above-mentioned peculiarities, and to count the stamens, and refer them to their respective classes, according to their number. The following classes depend upon other distinctions, which I shall enumerate in their proper order. The names of the classes are composed of Greek words, ingeniously contrived to express the peculiarities of each class, and absolutely necessary to be learned perfectly by heart, which cannot be considered as a difficult task, as there are but twenty-four of them, and far the greater number terminate in the same word, *andria*.

Flowers growing wild, without culture, are the most suitable for examination, because those that are domesticated in the rich soil of our gardens, are frequently transformed into something very different from what nature made them, by change of nourishment, &c. It will be proper to extend your observation to several flowers of the same class, as it sometimes happens, that the number of the stamens varies from accidental causes. But there is a beautiful regularity in most of Nature's works, that may assist you on that occasion. If the calyx of your flower be divided into five segments, and the corolla be formed of five petals, or divided into five parts, although

although you may find ſix or ſeven ſtamens, it is more than probable, that, on further inſpection, you will find that it belongs to the fifth claſs, Pentandria. It is time to conclude this digreſſion, and proceed to the eleventh claſs, Dodecandria, or twelve ſtamens. Some flowers in this claſs contain fewer, and others more, than the ſpecified number. All plants are included in it, that have any number of ſtamens from eleven to nineteen incluſive, provided they are diſunited. Let us ſearch then, for ſome more invariable characteriſtics to diſtinguiſh this claſs, and we ſhall find that the ſtamens are all fixed to the baſe or receptacle. In the twelfth claſs, Icoſandria, there ſhould be twenty ſtamens, or nearly that number, ſtanding upon the ſides of the cup, and ſometimes partly on the bloſſom; whereas the former and the following claſſes are marked by their ſtanding on the receptacle. Obſerve, as an additional diſtinction of this claſs from the next, that the cup conſiſts of one concave leaf, and that the petals are likewiſe fixed by their claws to the ſides of the cup.

Many ſtamens, from twenty to any number, are found in the thirteenth claſs, Polyandria, fixed on the baſe or receptacle. The flowers of this claſs have either a calyx, conſiſting of ſeveral folioles, or none at all.

In the preceding claſſes no attention has been paid to the length of the ſtamens, but they have been ſuppoſed to be all nearly equal in that reſpect. The diſtinctive marks of the next two claſſes depend chiefly on that circumſtance.

The fourteenth claſs, Didynamia, or two powers, will preſent you with flowers containing four ſtamens, ranged in one row, the inner pair ſhorter than the outer one. The eſſential marks of this claſs conſiſt in the proportionable arrangement of four ſtamens, as I have already expreſſed, accompanied with one pointal, and inveſted with an irregular Monopetalous corolla. Thoſe flowers that are called labiate, or lip-ſhaped, as well as the perſonate, or maſked flowers, are included in this claſs; thoſe of the firſt kind, have two lips, the one projecting over the other, forming, as it were, a ſhelter to the parts of the fructification from rain, &c. The lips are generally cloſed in the perſonate corollas, and entirely conceal the ſtamen and pointal from ſight.

Claſs the fifteenth, Tetradynamia; the meaning of this long word, is the power or ſuperiority of four, and accordingly its character is diſtinguiſhed by ſix ſtamens, four of which are long, and the remaining two are ſhort. It is chiefly compoſed of croſs-ſhaped flowers, with which you are already pretty well acquainted. The five following claſſes are not diſtinguiſhed by the

the number of the ſtamens, but by their ſituation. Their union or adheſion, either by their anthers or their filaments, to the pointal, decides to which of them they belong.

The ſixteenth claſs, Monodelphia, or one brotherhood. In this claſs the filaments are united at the bottom, but ſeparate at the top, as in the Marſh Mallow tribe.

The ſeventeenth claſs, Diadelphia, or two brotherhoods. The filaments of theſe flowers are alſo united at bottom, not into one bundle or brotherhood, but into two; and conſiſts of the papilionaceous flowers, which contain ten ſtamens and one pointal, nine of the ſtamens form one bundle below, the remaining one and the pointal form another above.

The eighteenth claſs, Polyadelphia, or many brotherhoods. The filaments in this claſs are united at the bottom only, into three or more bundles or brotherhoods.

The nineteenth claſs, Syngyneſia, is compoſed of flowers, generally compound, the eſſential character of which conſiſts in the tops being united, ſo as to form a cylinder; and a ſingle ſeed being placed upon the receptacle under each floret, perhaps, an example will give you the cleareſt idea of a compound flower; the Thiſtle is one ready at hand, being compoſed of ſmall flowers or florets, ſitting upon a common receptacle,

receptacle, and encloſed by one common empalement.

The twentieth claſs, Gynandria. Many ſtamens attached to, and growing upon the pointal itſelf. Hitherto our attention has been confined to ſuch flowers only as are termed complete, having both ſtamens and pointals on the ſame flower. But the next three claſſes will furniſh us with examples of thoſe which have only the one or the other in the ſame flower.

The twenty-firſt claſs, Monœcia, or one houſe. The flowers of different kinds being produced in the ſame habitation, or on the ſame individual plant. But in the next, or twenty-ſecond claſs, Dicœcia, or two houſes. The different kinds of flowers, which are diſtinguiſhed by the names of ſtaminiferous, or ſtamen bearing, and piſtilliferous, or bearing piſtils, are produced by different trees and plants of the ſame ſpecies.

The twenty-third claſs, Polygamia, provides for the only remaining ~~claſs~~, that can poſſibly happen, and conſiſts of flowers with ſtamens and pointals in ſeparate flowers, as well as both in the ſame flower, on one or on different plants.

The twenty-fourth claſs, Cryptogamia. Plants whoſe flowers are not perceptible by the naked eye, though there is good reaſon to believe that no plant exiſts without the eſſential parts that conſtitute the flower. The loweſt kinds of vegetables

TABLE OF THE CLASSES, referring to Plate IV.

Classes.			*Examples.*	
1 Monandria.	One Stamen.	- - -	- Mareſtail - - -	*Fig.* 1
2 Diandria.	Two Stamens.	- - -	- Speedwell, - - -	2
3 Triandria.	Three Stamens.	- - -	- Graſſes, - -	3
4 Tetandria.	Four Stamens.	- (All of the ſame length)	- Teaſel, - -	4
5 Pentandria.	Five Stamens.	- (Anthers not united)	- Honeyſuckle, - - -	5
6 Hexandria.	Six Stamens.	- (All of the ſame length)	- Hyacinth, - -	6
7 Heptandria.	Seven Stamens.	- - -	- Wintergreen, - -	7
8 Octandria.	Eight Stamens.	- - -	- Mezereon, - -	8
9 Enneandria.	Nine Stamens.	- - -	- Gladiole, - -	9
10 Decandria.	Ten Stamens.	- (Threads not united)	- Pink, - -	10
11 Dodecandria.	Twelve Stamens, or more.	(Fixed to the Receptacle)	Houſeleek, - - -	11
12 Icoſandria.	Twenty Stamens.	(Fixed upon the Calyx or Corolla)	Strawberry, - - -	12
13 Polyandria.	Many Stamens.	- (Fixed to the Receptacle)	Poppy, - -	13
14 Didynamia.	Four Stamens, two longer. One Pointal. Flowers ringent.		Foxglove, - -	14
15 Tetradynamia.	Six Stamens, four longer. One Pointal. Flowers cruciform.		Stock Gilliflower, -	15
16 Monodelphia.	Threads united at bottom, but ſeparate at top.	- -	Roſe Mallow, - -	16
17 Diadelphia.	Threads in two ſets. Flowers Butterfly-ſhaped.	-	Everlaſting Pea, - -	17
18 Polyadelphia.	Threads in many ſets; in three or more ſets.	- -	St. John's Wort, -	18
19 Syngeneſia.	Anthers united. Five Stamens. One Pointal. Flowers compound.	- - - -	Dandelion, - -	19
20 Gynandria.	Stamens upon the Pointal.	- - -	Orchis, - -	20
21 Monoecia.	Stamens and Pointals in ſeparate Flowers, upon the ſame Plant.	- - - - -	Cucumber, - -	21
22 Dioecia.	Stamens and Pointals diſtinct, upon different Plants.	-	Hop, - - -	22
23 Polygamia.	Various ſituations. Stamens only, Pointals only, or perfect Flowers.	- - - -	Aſh, - - -	23
24 Cryptogamia.	Flowers inconſpicuous.	- - -	Ferns, Moſſes, Liverworts, Muſhrooms, - -	24

a diſtinguiſhes the Stamens; *b* the Pointals.

Fig. 16


Fig. 17

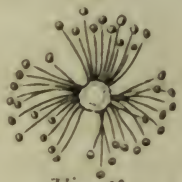
Fig. 18


Fig. 19


Fig. 20

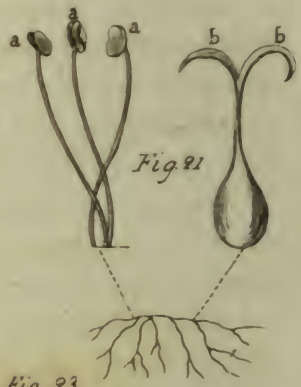

Fig 21


Fig. 22

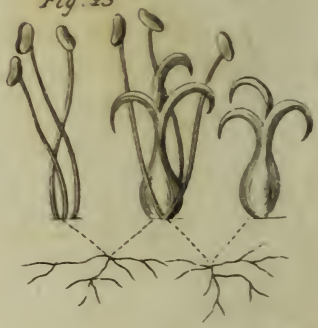
Fig. 23

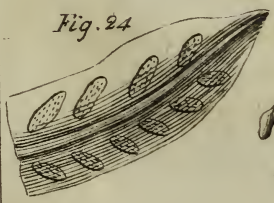
Fig. 24


24


24

vegetables are the objects of this class, as Ferns, Mosses, Sea Weeds or Thongs, and Funguses.

To these twenty-four classes, Linnæus has added the Palm trees, which do not fall under the description of any of the classes. He calls them Princes of India, bearing their fructification on a spadia or receptacle, within a spathe or sheath. Remarkable for their prodigious height, distinguished by an unvaried, undivided, perennial trunk, crowned at top by an evergreen tuft of leaves, and rich in abundance of large fine fruit. But since the time that Linnæus wrote, more certain knowledge of them has been obtained, and many of them are arranged in the sixth class. If you have patience and perseverance to learn the contents of this letter, you will deserve to be chosen queen of the May.

FELICIA.

LETTER VII.

Shrubbery, March 26.

I HAVE been in no haste to burden you, my dear Constance, with another letter, till I thought that I had given you time for digesting the last,

the

the ſubject of which is too important to the ſcience in which you are engaged, to be ſlightly paſſed over. When you find yourſelf perfect in your knowledge of the claſſes, or larger diviſions, this letter is intended to ſupply you with freſh employment, by making the diſtinctions of the orders that compoſe them. The orders of the firſt thirteen claſſes are founded wholly on the number of the pointals, ſo that, by adding *gynia*, inſtead of *andria*, to the Greek words ſignifying the numbers, you will eaſily obtain a knowledge of them, as Monogynia, one pointal; Digynia, two pointals; Trigynia, three pointals; Tetragynia, four pointals, and ſo on. In thoſe caſes, where the pointals have no apparent ſtyles, the ſtigmas are to be numbered, which generally adhere to the capſule like ſmall protuberances, as may be obſerved in the flowers of the Poppy.

There is no occaſion to count the pointals in the fourteenth claſs, Dydinamia, becauſe all the flowers of the Ringent tribes, including both the labiate and perſonate flowers, have but one pointal: but there is another obvious difference that preſents itſelf, as an aſſiſtant in diſcriminating the orders of this claſs, for moſt of the plants, that have a labiate flower, have four naked ſeeds at the bottom of the calyx, and the perſonate flowers are ſucceeded by a capſule, containing many ſmall ſeeds. From this diſtinction ariſes

an

an elegant, eaſy, and natural diviſion of the fourteenth claſs into two orders; Gymnoſpermia, comprehending ſuch as have naked ſeeds; and Angioſpermia, conſiſting of thoſe that have their ſeeds covered, or incloſed in a capſule. The fruit ſupplies us with marks for the ſubdiviſion of the next claſs, Tetradynamia, in which the flowers alſo have but one pointal. It is divided into two orders, called Siliculoſa and Siliquoſa, from the form of the fruit, which is denominated ~~Silicle~~ and Silique. The plants of the firſt order have a ~~ſilicle~~, or ſhort roundiſh ſeed-veſſel, or pericarp. Thoſe of the ſecond, contain their ſeeds in a ſilique, or long ſlender pod. In the ſixteenth, ſeventeenth, and eighteenth claſſes, the orders are diſtinguiſhed by the number of the ſtamens.

The chief difficulty, with reſpect to the orders, lies in the claſs Syngeneſia. This claſs comprehends thoſe flowers that are called compound, of which I gave you ſome notion in treating of the claſſes. Now, if you examine theſe floſcules, or florets, nicely, you will perceive that they have ſometimes both ſtamens and pointal; but you will alſo diſcover, that ſome have ſtamens only, whilſt others are furniſhed with a pointal alone; and laſtly, that there are floſcules without either one or the other. Let us diſtinguiſh the firſt of theſe, by the term perfect floſcules;

floſcules; the ſecond by that of ſtaminiferous; the third we will call piſtilliferous; and the fourth neuter floſcules Theſe variations require exact attention, becauſe on them, and on the form of the florets, Linnæus has founded the four firſt orders of this claſs. Polygamia is the family name applied to all orders, except the laſt; it is uſed in oppoſition to Monogamia, (Πολυς ſignifying many, and μονος one,) and implies that there are many florets incloſed within one common calyx, which coincides with the idea of a compound flower. The firſt order is called Polygamia Æqualis; the peculiar name æqualis means regular or equal, and infers that the floſcules are ſimilar, and all furniſhed with both ſtamens and pointals, as in the Dandelion. In the ſecond order, Polygamia Superflua, all the florets of the diſk, or centre of the flower, are perfect; thoſe of the ray or circumference, piſtilliferous, both of them produce ſeed; the Daiſy is a familiar inſtance. The third order of the claſs, Syngynèſia, is entitled Polygamia Fruſtranea. The florets in the diſk or centre are perfect, and produce ſeed, whilſt thoſe of the ray are imperfect, and therefore fruſtrate or barren; from which circumſtance the order takes its name; example, Bluebottle. The ſituation is reverſed in the fourth order, Polygamia Neceſſaria; for the florets in the diſk, though apparently

Fig 1

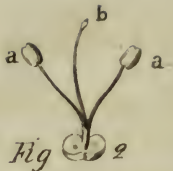

Fig 2

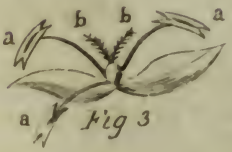

Fig 3

Fig 4

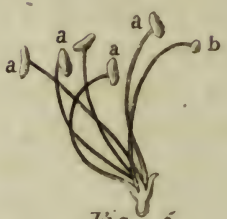

Fig 5

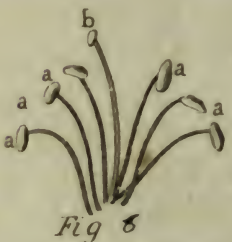

Fig 6

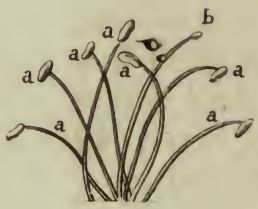

Fig 7

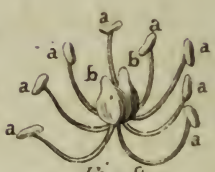

Fig 8


Fig 9


Fig 10


Fig 11

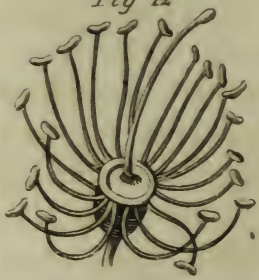
Fig 12


Fig 13

Fig 14

Fig 15

apparently perfect, are not really so, and therefore produce no perfect seed; but the fertility of the pistilliferous floscules in the ray compensate for the deficiency of those in the centre of the flower, as is seen in the Marygold. The fifth order, Polygamia Segrata, has many floscules inclosed in one common calyx, yet each of the floscules has one appropriate to itself. Globe Thistle supplies me with a beautiful example. Monogamia, the sixth and last order, consists of plants, with simple, not compound, flowers, which peculiarity will sufficiently distinguish it from the rest, remembering at the same time to attend to its classical character, of having the stamens united by the anthers: this order is exemplified in the Violets. The orders of the three following classes, Gynandria, Monœcia, and Dicœcia, being founded upon the stamens, and taking their names from the preceding classes, according to the number, union, or disunion of the stamens in the respective flowers, require no particular elucidation.

There are three orders in the twenty-third class, Polygamia, depending upon the mode in which the three sorts of flowers may be arranged. When a plant bears both perfect and imperfect flowers, the order is entitled Monœcia. But when they are produced on separate plants of the same species, the order is Dicœcia. And when

when one plant of the ſame kind produces perfect flowers, a ſecond ſtaminiferous flowers, and a third piſtilliferous flowers, the order is known by the name of Tricœcia, or three houſes; implying that the three ſorts of flowers have three different habitations.

The laſt claſs, Cryptogamia, conſiſts of plants, whoſe parts of fructification are either obſcure or very minute, which prevents the poſſibility of arranging the orders according to the number and ſituation of the ſtamens and pointals. The peculiarity of ſtructure of the plants of this claſs, diſtinguiſhes them ſufficiently from all others. It is naturally divided into four orders, firſt Filices, or Ferns; ſecond, Muſci, or Moſſes; third, Algæ, or Sea Weeds; and fourth, Fungi, or Funguſes. The ferns comprehend all plants that bear their ſeeds in the back, or edges of the leaf. The moſs kind forms the ſecond order. The third includes the lichens, fuci, and many others, whoſe eſſential parts are too minute or obſcure for inveſtigation. If the funguſes have any fructification, it is imagined to be underneath, in the gills, pores, &c. Thus we have, at length, reached the end of the claſſes and orders, which I think will ſupply our walks with amuſement for the whole ſummer; and, by forming a taſte for this delightful part of nature, lay a foundation that will continue to furniſh

new

new and intereſting objects, to the end of our lives. I cannot wonder that a country reſidence is diſagreeable to thoſe, who have no reliſh for the objects it preſents; but it may well be preferred by perſons of true taſte and obſervation, who clearly perceive the traces of Infinite Wiſdom and Intelligence in the ſtructure of every leaf and every bloſſom. May rural pleaſures always ſuffice to render you cheerful and happy.

FELICIA.

LETTER VIII.

Shrubbery, April 2.

WHENEVER you ſet out on a botanical excurſion, remember to put your magnifying glaſs and diſſecting inſtruments into your pocket, that you may not be obliged to neglect thoſe flowers that are ſmall, for want of this precaution. Always gather ſeveral flowers of the ſame kind, if poſſible, ſome juſt opening, and others with the ſeed-veſſels almoſt ripe; and as I intend to ſelect our examples from plants of Britiſh growth,

growth, you muſt ſeek for them growing wild in their native fields; nor confine your walks within the limits of a garden wall. Thus I hope you will obtain health, and a knowledge of vegetables at the ſame time. That nothing might be left undone by Linnæus, the great maſter of method and arrangement, to render the acquiſition of his favourite ſcience eaſy, he has divided the orders, when numerous, into ſeveral diviſions, each including one or more genera, which is a means of diminiſhing the pupil's labour. Let us ſuppoſe, that you have a plant under obſervation, belonging to an order that contains a great number of genera: you are confuſed, and know not to which to apply it. But on remarking theſe diviſions, you are enabled to place it among a few of its brethren, there remains but little difficulty to diſcover its peculiar marks, and aſſure yourſelf of the identical plant. The firſt claſs, Monandria, contains but two orders, both depending upon the number of the pointals. Moſt of theſe plants are natives of India. Our ditches and muddy ponds, however, produce one example, that you may eaſily procure. It is called Mareſtail (Hippuris) has neither empalement nor bloſſom. Its ſingle ſtamen grows upon the receptacle, terminated by an anther ſlightly cloven, behind which you will find the pointal, with its awl-ſhaped ſtigma, tapering

tapering to a point. The ſtem is ſtraight, and jointed, and the leaves grow in whorls round the joints; at the baſe of each leaf is a flower, ſo that the number of flowers and leaves is equal. Its ſeaſon of flowering is the month of May. As there are but few objects of native growth to arreſt our attention in this claſs, we will proceed to the next.

The Privet (Ligiſtrum) is a ſhrub common enough in the hedges in many parts of England, and when mixed with other ſhrubs, makes a pleaſing variety in our gardens. It bears a white bloſſom, and generally flowers in June. It has a very ſmall tubular calyx of one leaf, its rim divided into four parts. The bloſſom is alſo monopetalous and funnel-ſhaped, with an expanded border cut into four egg-ſhaped ſegments. Its ſtamens are two, (which determine it to belong to this claſs,) placed oppoſite to each other, and nearly as long as the bloſſom. The ſeed-bud is roundiſh, the ſtyle ſhort, terminated by a thick, blunt, cloven ſtigma. The ſeed-veſſel is a black berry, containing but one cell, which incloſes four ſeeds. The leaves grow in pairs, and are ſometimes variegated with white or yellow ſtripes. The berries are uſeful to the dyers, as they give a durable green colour to ſilk or wool by the addition of alum. In the ſecond diviſion of this order is a genus, the

Latin

Latin name of which is Veronica, but commonly known by that of Speedwell. There are a great many ſpecies of it, which has induced Linnæus to treat it in the ſame manner as the orders, and to divide it into three principal diviſions. Firſt, Flowers growing in ſpikes. Secondly, Flowers in broad bunches. Thirdly, Fruit-ſtalks with one flower. The monopetalous wheel-ſhaped corolla, divided into four ſegments, the loweſt of which is narrower than the reſt, and that oppoſite to it the broadeſt, eaſily diſtinguiſh this genus, as well as the heart-ſhaped flatted capſule with two cells. Several of the ſpecies are cultivated, and increaſe the beauty of the flower beds in the early part of ſummer. You will ſoon be tired of theſe deſcriptions, if you do not unite them to the living objects. Search for ſome others in the ſame claſſes, and oblige me with your account of them. In this manner we may contribute to each others amuſement, though we cannot enjoy each others company. Yours, with warm affection,

FELICIA.

LETTE

LETTER IX.

Shrubbery, April 15.

HOW often have we walked through the meadows and paſtures, without opening our eyes to the wonders they contain! We were, indeed, delighted with gathering a bouquet of the gayeſt flowers we could collect, and ſometimes admitted a piece of graſs, for the beauty of its pendant head. But we little thought, that every ſingle blade of theſe apparently inſignificant plants, as we have been accuſtomed to conſider them, bears a diſtinct flower, perfect in all its parts; nay, more complete than the fragrant Lily or the gaudy Tulip, and only requires to be nicely viewed, to excite our value and admiration. This humble tribe is extremely numerous, and, like modeſt merit in other ſituations, of moſt extenſive utility. There are upwards of three hundred ſpecies, but as they have been ſcarcely noticed till within twenty or thirty years, we may believe that time will improve our knowledge of their properties and ſtructure. Dr. Withering ſays, "that, the leaves furniſh paſturage for cattle, the ſmaller ſeeds are food for birds, and the larger for man; but

but ſome are preferred to others: as the Feſcue for ſheep; the Meadowgraſs for cows; the Canary for ſmall birds; the Oat for horſes; the Ryegraſs, Barley, and Wheat for men; beſides, a variety of beautiful inſects derive their nouriſhment from them:" and if we enumerate the remote benefits that accrue from them, their conſequence increaſes to an extraordinary height. What may be called the moſt important articles of both food and cloathing, are derived from this unnoticed and neglected tribe. Bread, meat, beer, milk, butter, cheeſe, leather and wool, and all the advantages produced from the uſe of cattle, would be loſt without them.

But I think I hear my dear ſiſter exclaim, you are very earneſt in ſetting forth the praiſes of graſſes, and, in order to enhance their dignity, you rank the various kinds of corn among them. But you will ſoon be convinced, when I have given you their general character, that they are all of one family. Obſerve their whole appearance: you know a blade of corn or graſs, at firſt ſight, from every other plant that grows near them. What is it that diſtinguiſhes them? Their ſimple, ſtraight, unbranched ſtalk, hollow and jointed, commonly called a ſtraw, with long, narrow, tapering leaves, placed at each knob or joint of the ſtalk, and ſheathing or incloſing it, as if by way of ſupport: their ears or heads

conſiſt

conſiſt of a huſk, generally compoſed of two valves, which form the empalement, the larger leaflet hollow, the ſmaller flat, within which is, what may be termed the bloſſom, which is alſo a huſk of two valves, dry and ſhining: theſe minute flowers are furniſhed with a honey-cup, but it requires very good eyes or a glaſs to diſcern it. The fructification of graſſes is beſt obſerved, when they are nearly ripe, and their huſks expanded, which renders their three ſlender filaments, tipped with large oblong double anthers, eaſily perceptible: theſe filaments play freely about upon the ſlighteſt motion, and their number, three, will leave you at no loſs to place theſe plants in the third claſs, Triandria; and the two pointals reflected or turned back, with their feathered ſtigmas, determine them to belong to the ſecond order of that claſs: ſeed-veſſels they have none, but each ſeed is incloſed, either by the bloſſom or empalement. As they ripen, the huſks open, and, if not timely gathered, the ſeed fall to the ground, which is one among many means uſed for the increaſe and propagation of vegetables. They have fibrous roots, ſomething like a bundle of ſtrings. The extraordinary precautions diſplayed in the preſervation of thoſe plants, that are chiefly deſtined to ſuſtain men and animals, was remarked in the delineation of the papilionaceous tribe; and

here again the ſame care is conſpicuous, and calls for further gratitude and admiration. What a dreary habitation would this earth be, were it deſtitute of its verdant covering, ſo ſoft to our feet, and refreſhing to our ſight! But when we reflect, that this delightful carpet, which is ſpread every where around us, is the prey of almoſt every animal that approaches it, how much is to be apprehended for its ſafety! But Providence has ordained, with the utmoſt wiſdom and beneficence, that the more the leaves are cropped, the faſter the roots encreaſe; and, what is ſtill more wonderful is, that the animals that browſe on graſſes, though left at full liberty in the paſture, leave the ſtraws which ſupport the flower and the ſeed untouched; and what more clearly manifeſts that theſe things are not the effects of chance, but the reſult of Divine Intelligence, is that thoſe ſpecies, which flouriſh on the tops of mountains, where the ſummer heats are not ſufficient to bring their ſeeds to perfection, are generally encreaſed by the root, or winter-buds, and do not depend upon the ſeed for encreaſe. Linnæus, according to his uſual method, has arranged this numerous order into ſeveral diviſions, marked by their manner of growth, they are firſt divided into thoſe that bear ſpikes, and ſuch as are produced in panicles; a panicle is a kind of looſe bunch, in

which

which the flowers grow irregularly, and rather ſcattered. The three firſt diviſions include thoſe that are produced in this manner, and are diſtinguiſhed by the number of flowers in each empalement.

The firſt diviſion has but one flower,
The ſecond two, and
The third ſeveral.
The fourth diviſion conſiſts of all thoſe that grow in ſpikes or heads.

Beſides the plants that fall under this order, there are others of the graſs kind, that differ in ſome of their characters, and are referred to their proper claſſes, and orders. Vernal Graſs has only two ſtamens, and conſequently ranks in the claſs Diandria. We are indebted to this graſs for the delightful fragrance of the new-mown hay. The various diſpoſals of the ſtamens and pointals on one plant in Hard Graſs, and Soft Graſs, exclude them from this claſs, though, in other reſpects, they partake of the general character. I have ſelected the Panic Graſs as an inſtance of the firſt diviſion. It is known by the following diſtinctions: its huſk has three unequal valves, nearly egg-ſhaped, the ſmalleſt of them ſtanding behind the other two, containing one floret, which conſiſts of two valves, not

ſo large as thoſe of the empalement. The ſtamens are three; ſhort, hair-like, and tipped, with oblong anthers. The ſeed-bud is roundiſh, and the two pointals crowned with downy ſummits. Each bloſſom incloſes a roundiſh ſeed, flattened a little on one ſide. In the next diviſion there are but two genera. Hair Graſs and Rope Graſs, which we will paſs over, as there is nothing particularly ſtriking in their manner of growth. Quake Graſs, Meadow Graſs, Feſcue, Broom Graſs, Oat, and Reed, are all pretty common, and fall under the third diviſion. The genera are chiefly diſtinguiſhed by the different form of the corollas, and the ſhape of the valves: there are many ſpecies of each genus; but I muſt omit various particulars worthy of your notice, as my letter is already of an immoderate length, and I have not yet touched upon the principal kinds of corn. The eſſential character of the Oat, conſiſts in the jointed twiſted awn, or beard, that grows from the back of the bloſſom. It is remarkable for the elegance of its panicle, and the flexibility of the fruit ſtalk, which turns with the ſlighteſt breath of wind. Among the Reeds, the Sugar Plant is included, as well as the Bamboo, which grows in the Eaſt Indies. It is time to haſten to the fourth and laſt claſs, which contains the individuals of this family, that are moſt important to man, as Rye, Barley,

Barley, Wheat, Darnel, and Dogſtail. Theſe are diſtinguiſhed from the former diviſions, by always growing in a ſpike or ear.

Rye has two flowers, included in the ſame empalement.

Wheat has three.

Barley has ſix-leafed involucre, containing three ſimple flowers.

The other two are contained in the involucre of a ſingle leaf, and their flowers are compound.

In Rye, there frequently is a third floret upon a fruit-ſtalk, between the two larger ones, which have no ſtalk. In ſome ſpecies of Barley, all the three florets, which grow together, have both ſtamens and pointals; but, in others, the middle florets alone are furniſhed with thoſe parts, the lateral florets having only two ſtamens. The exterior valve of the corolla in Wheat is ſometimes bearded, but not always. The calyx moſtly contains three or four flowers, and the middle one is often imperfect. The filaments in Rye and Wheat are long, and hang out beyond the corolla, which expoſes theſe grains to more injury from heavy rains, than that of Barley, in which the filaments are ſhorter. Corn is the produce of cultivation, in all countries where it grows; and, what is extraordinary

is, that it is not known of what country it was originally a native. It differs in excellence, according to the soil and temperature. Wheat prefers a country that is rather warm, and flourishes most in the southern parts of the temperate zone, rejecting both extremes of heat and cold. This letter will supply you with employment till the Hay season is over. Adieu! Ever yours,

FELICIA.

LETTER X.

DEAR CONSTANCE, *Shrubbery, May 3.*

THOUGH the grasses are so numerous, and form so large a part of the third class, they do not exclude others from it, that are worth notice, either on account of their beauty, or peculiarity of construction. The majestic tribe of Flag flowers, and the modest Crocus, the welcome harbinger of spring, with some others, belong to it. They are characterised by a spathe or sheath, instead of an empalement. The corolla either consists

conſiſts of ſix petals, or is divided ſo deeply, as to appear as if it were ſo. The petals of the different ſpecies of Iris have a peculiar conſtruction, which claims your notice; the three outward ones are reflected or turned back, the other three ſtand upright, and are ſharper; though they appear as if they were ſeparated, they are all connected together by the claws. In the centre of the flower there ſeems to be three other petals, which in reality are nothing but the pointal, divided into three parts: it has a very ſhort ſhaft, but the ſtigma is large, broad, and reflected; underneath each diviſion lies concealed a ſingle ſtamen, terminated by its ſtraight, oblong, flattened anther. Some of the ſpecies are adorned by a kind of fringed beard along the middle of the reflex petals, but this is not common to them all. The capſule is beneath the flower, and agrees, in its form and diviſions, with the number of ſtigmas, being triangular; though there are ſome kinds that have ſix angles and only three cells. The leaves of theſe plants are long and narrow, reſembling thoſe of graſs, and moſtly proceed from the root. There is an affinity between theſe plants and the liliaceous tribe, notwithſtanding they are diſtinguiſhed by ſome particulars that place them in different claſſes.

The flowers of the next class, Tetandria, are characterised by having four stamens; so are those of the fourteenth: but it is necessary to remark, that those, under present observation, are all of the same length, whilst those of the fourteenth are known by their inequality, two of them being long, and two of them short, which is a distinction, that must never be forgotten. The first order is thrown into five divisions; some of the flowers, of which it is composed, are called aggregate. At the first view, you might be ready to decide that they were compound flowers; but upon a more accurate inspection, you will find, that besides the florets growing on one common base or receptacle, inclosed by a general cup or empalement, that each little floret has a separate cup peculiar to itself; thus we may consider them, with more propriety, as a head of distinct flowers, growing together, than as one compound flower composed of many parts. Let us take the Teasel * for an example. The common cup, containing the whole, consists of many leaves, which are flexible, and longer than the florets themselves; the receptacle is of a conical form. The proper cup, belonging to each floret, is so small as to be scarcely perceptible; those of the Scabious †, another genus of this order, are double. Each individual flower is formed of one

* Dipsacus. † Scabiosa.

one tubular-ſhaped petal, and they are ſeparated from each other by chaffy leaves growing between them. In the ſecond diviſion you will meet with the plantains *, of which there are ſeveral ſpecies; it is a plant familiarly known to you, as you frequently gather it for your favourite Goldfinch; but as it is not very beautiful, perhaps you never examined it minutely. Gather a head or ſpike of it, and you will perceive that it is compoſed of many ſmall flowers, which you muſt conſider one at a time, to become acquainted with the parts of the fructification. Each of them has the calyx and the corolla divided into four ſegments, and the border of the latter turned back, as if broken; the filaments are very long, and the ſeed-veſſel egg-ſhaped, with two cells. In the graſs-leafed Plantain, the ſtamens and pointals are in ſeparate flowers. The fourth diviſion contains a natural order, called the Starry Plants, which nearly agree in the following character: they have a ſmall cup divided into four ſharp ſegments, above the ſeed-veſſel. The bloſſom is monopetalous and tubular, with an expanding border with four diviſions. The ſtamens are four, with ſimple tips: the ſeed-bud double, containing two globular ſeeds; the ſtigma cloven or divided; and the ſtems four cornered, ſurrounded by the leaves in the form of a

* Plantago

ſtar. Madder *, Gooſegraſs †, Woodroof, and Reedwort are of this family. There is a very ſingular plant belonging to the ſecond order, which I cannot paſs by, without mentioning its peculiar properties; it is called Dodder ‡, and is one of that kind that Linnæus has named paraſitical, from the habit of clinging and ſupporting themſelves by any other plant that grows near them. Hops, Flax, and nettles are its favourites. It decays at the root, and receives its future nouriſhment from the plant to which it adheres, as ſoon as the young ſhoots have twiſted themſelves round the branches of a neighbouring plant; they inſert a kind of gland into the pores of its bark, and, by this means extract its juices, and thus, in return for the ſupport and aſſiſtance they receive, they deſtroy their benefactor; an inſtance, that leſſons of morality may be learned from the vegetable, as well as the animal kingdom. Thoſe that entertain flatterers in either, are generally repaid with ingratitude. With full aſſurance that our affection is mutual, and our gratitude reciprocal, I ſubſcribe myſelf entirely yours,

FELICIA.

LETTER

* Rubria, † Galium. ‡ Cuſcula.

LETTER XI.

Shrubbery, May 20.

SO numerous are the objects that the class Pentandria presents, that I feel myself at a loss how to select a few of them for your observation. Happily for me there are several natural orders in this class, which, by grouping many of them together, will enable me to perform my task more easily. The first division of the first order includes a family of plants, whose leaves are rough and hairy, and without leaf-stalks. Besides this peculiarity, they agree in having a cup of one leaf, with five clefts or divisions, a blossom of a tubular shape, also monopetalous, and the same number of segments; the five stamens are fixed to the tube of the blossom, and they have four naked seeds inclosed by the cup. Lungwort* is of this order: one species of it has a rough stem as well as leaves; the tube is white, but the border of the blossom is purple when it first opens, but afterwards becomes blue. You have probably admired the flowers of the Borrage †, when used for the cool tankard in summer, without remarking that the blossom is wheel-

* Pulmonaria. † Anchusa.

wheel-ſhaped, and the mouth crowned with five ſmall protuberances; the fine blue colour of the petals, contraſted with the black lips, render it extremely pleaſing to the eye. Mouſe Ear, or Scorpion Graſs, is common in dry paſtures, and by the ſides of rivers. In ſome ſpecies of it, the ſeeds are covered with hooked prickles, which, by adhering to whatever touches them, is a curious method of conveying them from place to place. The beauty of the bloſſom of this minute flower repays the pains of examining it cloſely; it is of a celeſtial blue, adorned with a yellow eye. The generic character of Bugloſs conſiſts in the bending curve of the tube of the bloſſom. Houndſtongue * is diſtinguiſhed by each ſeed being incloſed in four ſeed-coats, fixed to the ſhaft of the pointal; it has a ſtrong ſmell like that of mice, and grows by hedges and pathways. The natural order, called Precia, is included in the ſecond diviſion of the firſt order of this claſs, and receives its name on account of the early appearance of the plants that compoſe it. The Primroſe†, Oxlip†, and Cowſlip†, the ornament of our meadows, in the early part of ſpring, belong to it. The Polyanthus† and Auricula† admired and cultivated by floriſts, for their variety and beauty, are derived from this ſtock; a pleaſing inſtance of the improvement

* Cynogloſſum. † Primula.

ment that art is capable of beſtowing on nature; and reſembling, in ſome degree, the difference between the untutored mind, and that of a perſon of education. The calyx of theſe flowers is of one leaf, tubular, ſharp, and upright; the bloſſom alſo tubular, and of one petal, with the border divided into five ſegments; the ſeed-veſſel is a capſule, ſuperior, or incloſed within the calyx, containing only one cell; the ſtigma is globoſe. The ſpecies is marked by a five angled calyx, the wrinkled ſurface and indented edges of its leaves. The Primroſe has but one flower upon a fruit-ſtalk; the Oxlip and Cowſlip ſeveral. I need not tell you, that the bloſſoms of all theſe are generally of a pale yellow. The ſame diviſion, of the firſt order of this claſs, contains a tribe of plants, called Luridæ, a name expreſſive of their noxious appearance and ſtrong ſcent, marks kindly impreſſed by nature, to warn the incautious againſt their baneful effects, moſt of them being poiſonous in a wild ſtate; but change of ſoil and cultivation have rendered even ſome of theſe eatable: others yield to the ſkill of the phyſician, and, under proper management, are uſeful in medicine. Beſides the characteriſtic marks of five ſtamens and one pointal, they coincide in a calyx, that is permanent, and divided, like the corolla, which conſiſts of one petal, in five ſegments.

Their

Their ſeed-veſſel has two diviſions, and is either a capſule or a berry, incloſed within the flower.

A few individuals of this noxious family will ſuffice to guard you againſt approaching the reſt too familiarly. The Thornapple* has an oblong cup of one leaf, divided into five angles and five teeth, which, though it falls off when the ſeed ripen, leaves part of the baſe behind. The corolla is funnel-ſhaped, ſpreading wide from a long tube into a border, with five angles and five plaits; in one of the varieties, the bloſſom is white, and, at night, the leaves riſe up and incloſe the flower. The capſule is large and covered with thorns; it has four diviſions, and grows upright upon the remains of the cup; the ſeeds it contains are numerous and kidney ſhaped. The ſmell of the Henbane†, though very diſagreeable, has not always been ſufficient to deter ignorant perſons from ſuffering the fatal conſequences of its poiſonous qualities. Madneſs, convulſions, and death, have been produced by it. The common ſort is diſtinguiſhed by its indented leaves, embracing the ſtem, on which the flowers ſit cloſe. It has a funnel-ſhaped bloſſom, with five blunt ſegments, one broader than the reſt. The whole hairy, and covered with fœtid clammy juice, deſigned, perhaps,

* Datura, † Hyaſcyamus.

perhaps, to drive away insects, which would otherwise be injurious to it. The Nightshade* is a principal genus in this forbidding order. The wheel-shaped corolla, short tube, and large border, stamens having oblong lips, approaching so nearly as to appear like one object, in the middle of the blossom, with the round glossy berry of this tribe, readily distinguish the plants that belong to it. Prickly stalks characterise some of the species, but others are void of these defensive weapons. The berry of the woody Nightshade is red, and its blue blossoms sometimes change to flesh-colour or white, whilst the garden Nightshade is known by its black berries and white blossoms. The Dwale, or deadly Nightshade, is the most fatal in its effects. The leaves are egg-shaped and undivided, the blossoms a dingy purple. Woods, hedges, and gloomy lanes mostly conceal this dangerous plant; though it too frequently lurks near the husbandman's cottage, whose children are endangered by the tempting appearance of its bright shining black berries. The class Pentandria comprises so many orders, most of which contains genera worthy your attention, that it will supply matter for several letters. The present one being already of sufficient length, I will close

* Solanum.

cloſe it, with the account of the Luridæ, from whoſe poiſonous influence, I hope you will always be preſerved. Farewell.

FELICIA.

LETTER XII.

DEAR CONSTANCE, *Shrubbery, May* 10

AS I told you at the concluſion of my laſt letter, that we had by no means exhauſted the ſtores of the fifth claſs, I ſhall proceed to give you an account of another family of plants. contained in the firſt numerous order. A permanent calyx with five diviſions, a bell-ſhaped corolla of one petal, and a capſule for a ſeed-veſſel, are the marks by which the natural order Campanacei, or Bell flowers is known. The elegant genus, Convolvulus, belongs to it, which receives its name from its propenſity to entwine itſelf around any thing near which it grows, though there are ſome ſpecies of it that do not poſſeſs this quality. You will eaſily diſtinguiſh the flowers of this kind from all others, by their large,

large, expanding, plaited corolla, ſlightly indented at the edge with five or ten notches, the pointal terminating in two oblong ſummits, and the capſule, containing two roundiſh ſeeds, incloſed by the cup. The ſmall Bindweed * is common in corn fields, the leaves are arrow-ſhaped, ſharp at each angle, the flowers grow ſingle upon a fruit-ſtalk, the colour of the bloſſom varies, it is ſometimes reddiſh, or white, or ſtriped, or purple. This humble trailing plant, though troubleſome to the farmer, poſſeſſes more beauty than many that are cultivated for their rarity. The great Bindweed, another ſpecies of the ſame genus, with pure white bloſſoms, ſo often ſeen in fantaſtic wreaths, entwined on hedges or buſhes, is another ſpecies. The leaves of this plant are alſo arrow-ſhaped, but the angles at the baſe appear as if they had been cut off, the fruit-ſtalk is four cornered, and ſupports a ſingle flower; cloſe to the cup are two heart-ſhaped floral leaves, which ſeem to incloſe it. The Bell flowers have a honey-cup in the bottom of the bloſſoms, which is cloſed at the baſe with five ſharp valves, approaching and covering the receptacle; from theſe valves ariſe the ſtamens; the ſtigma has three diviſions, which are turned backwards. The ſeed-veſſel is a capſule, below the flower, with three or five cells at the top of

* Convolvulus.

of each is a hole, for the purpose of letting out the seeds as soon as they are ripe. What curious provision is made, not only to preserve the seeds of plants, but also, to distribute them, that the species may not become extinct from negligence or inattention. The seed-vessels of the Giant Throatwort*, after the flowers are faded, turn downwards till they discharge their contents, and then rise up again. This plant is known by its strong, round, single stalks, its leaves between egg and spear shaped, their edges toothed, the flowers are solitary, growing on nodding fruit-stalks, towards the upper part of the stalk. The whole plant abounds with a milky liquor. Our favourite shrub, the Honeysuckle †, is included in the same order of the fifth class, that has engaged so much of our time. You are well acquainted with its beauty and fragrance, but probably have never minutely examined its parts. The corolla is monopetalous and irregular, the tube long, five segments divide the border, which are rolled backwards, and one of them is scolloped deeper than the others. The seed-vessel is a berry with two cells, placed beneath the flower, and crowned with a cup. Several other well known shrubs rank in the same order, some armed with thorns or prickles, and others defenceless; amongst the former is the Buck-

* Campanula. † ~~Tonicera~~ Lonicera

Buckthorn *, from which ſap-green is made, by mixing alum with the juice of its ripe berries. The flowers are always incomplete, ſome plants producing only thoſe that have ſtamens, others bearing thoſe with a pointal alone.

Every part of this ſhrub contains the property of ſtaining or colouring. In one ſpecies, the inner bark is yellow, the outer ſea-green, and the middle bark as red as blood. It is uſed by the dyers. Before I diſmiſs the ſhrubs of this order, I muſt notice the Currant †, the fruit of which is ſo refreſhing and agreeable, whether eaten freſh from the tree, or preſerved with ſugar. It is found wild in many parts of England. The Periwincle ‡ will ſupply me with an example of one more natural order, named Contorta, becauſe the diviſions of the corolla are turned in the ſame direction with the apparent motion of the ſun. There are ſeveral varieties of it, chiefly diſtinguiſhed by the different colours of the corolla, which is ſalver-ſhaped, the ſegments connected with the top of the tube, which forms a figure of five ſides. The general characters of this order are a cup of one leaf, divided into five ſegments; a corolla of one petal, frequently funnel-ſhaped, and furniſhed with a remarkable nectary, and a fruit, conſiſting of two veſſels, filled with many ſeeds. I ſhall now proceed

* Rhamnus. † Graſſularia. ‡ Vinca.

proceed to the ſecond order of the fifth claſs, which contains a numerous family, in its third diviſion, of umbelliferous plants, or plants, the flowers of which are diſpoſed in rundles; but as the deſcription of them will much exceed the limits of this letter, I ſhall defer them till my next, and point out a few examples of a different appearance, that belong to this order. The Groſefoots * are a tribe that will not invite notice by their beauty, being generally deſtitute of bloſſom; they are known by a five-leaved, five-angled, permanent calyx, incloſing one ſingle, round, compreſſed ſeed, when that is ripe, the calyx falls off, being no longer neceſſary. One ſpecies, called Allgood, is ſometimes ſubſtituted for Spinach. The ſame claſs and order includes alſo the Gentians §, which are diſtinguiſhed from their companions, by an oblong tapering capſule, ſlightly cloven at the end; it has one cell and two valves, to each of which adheres a receptacle growing lengthwiſe. The flowers vary in different ſpecies, but the figure of the fruit is uniform, therefore a proper characteriſtic for the botaniſt, whoſe ſkill conſiſts in diſcovering thoſe parts, which are conſtantly alike, in all the ſpecies of the ſame genus. Linnæus was the firſt who perceived the advantage of finding invariable marks, for claſſing and

* Chenopodium. § Gentiana.

and arranging the innumerable productions of the vegetable kingdom. Perhaps you will be ſurpriſed to hear, that the ſtately Elm * ranks with plants of ſuch inferior ſize and appearance; but you muſt remember, that it is not the outward form, but the ſimilarity of the parts that are invariable, that unites different plants in the ſame claſs. Few perſons, but thoſe of nice obſervation, know that this tree bears any flower, becauſe it is ſmall, and appears in a ſeaſon, when the fire-ſide is more inviting to the indolent, than the wholeſome walk. The flowers precede the leaves, and ſoon fall off; the calyx has five clefts, and is coloured on the inſide; it has no corolla, but the ſeed-veſſel is an oval berry without pulp, containing only one ſeed, rather globular and a little compreſſed. The bark of the trunk is crooked and wrinkled, and is uſed as a medicine in ſeveral diſorders. The evening is beautiful, and I am ſummoned by Mrs. Snelgrove to attend her in the garden. Love me as well as when we were together, and believe that my attachment is undiminiſhed.

FELICIA.

* Ulmus.

LETTER

LETTER XIII.

Shrubbery, May 19.

THE umbellate plants, my dear ſiſter, are ſo termed from their peculiar manner of growth, which differs materially from moſt others. From a ſtraight ſtem, generally hollow and pithy, furniſhed with alternate leaves, proceed ſmaller ſtems, forming a ſharp angle at their baſe, and diverging, or ſpreading like rays from a centre, in form of the ribs of an umbrella, which gives them the name of umbellate, each of the ſtems, which form theſe rundles or umbels, as they are called, are frequently crowned with a rundlet or ſmaller ſet of rays, terminated by the flowers, the parts of which I ſhall deſcribe more minutely hereafter; as their diſtinctions are the principal thing to be obſerved, in determining to which claſs or order they belong. The baſe of each circle of ſtems is ſometimes ſurrounded with ſmall leaves, called an involucre or fence, which is termed general, when it incloſes the whole rundle; and partial, if found at the baſe of the rundlet: many kinds have no fence: theſe differences throw the tribe into three diviſions. The firſt including the plants with general fences,

fences, the next thoſe with partial ones, and the laſt thoſe deſtitute of any. The properties of this tribe are affected by ſoil and ſituation; thoſe in dry places are aromatic and beneficial to the ſtomach; but the produce of watery ones are frequently poiſonous. Various parts of many individuals of this race, ſupply our tables with a pleaſing change of vegetables. We eat the roots of Carrots and Parſneps; the ſtalks of Celery and Finochia enrich our ſalads; the ſtems of Angelica, preſerved, make a good ſweetmeat; the leaves of Parſley and Fennel add a fine flavour to forcemeats and broths; and thoſe of Samphire are uſed as a pickle, whilſt the ſeeds of the Coriander and Carraway not only aſſiſt digeſtion, but, being encruſted with ſugar by the confectioner, are eaten in the form of ſugar-plums. When you are acquainted with a few of theſe plants, you will probably think their character and appearance ſo peculiar, that you ſhall not be liable to confound them with others of a different order; but, my dear Conſtance, to ſecure yourſelf from ſuch a miſtake, it will be always neceſſary to examine the contents of the flower carefully, as the only ſure teſt to be relied upon. As there are plants of a different conſtruction, that reſemble theſe in appearance, at leaſt to the eye of a ſuperficial obſerver, without poſſeſſing the eſſential requiſites of the umbellate tribe; they conſiſt of a

cup

cup ſcarcely diſcernible, a corolla that grows upon the ſeed-bud, formed of five petals, which are generally heart-ſhaped and bent inwards, five ſtamens, and two pointals, upon a naken fruit compoſed of two ſeeds growing together. The bloſſom of the Elder reſembles them greatly at firſt ſight, but, on further examination, you will be convinced that it has no claim to be ranged among them. After this general account of the umbellate tribe, you muſt be contented with a few remarks only, concerning ſome of the plants that compoſe it, as I am deſirous of exciting your particular attention to the diſtinctions of the various ſpecies, which you ſhould beſtow on the real individuals, truſting to no written deſcriptions, as many of them have a ſtrong likeneſs, as to external appearance, to thoſe which poſſeſs very oppoſite qualities. Parſley and Fools Parſley, Garden-Chervil and Hemlock-Chervil, Creeping Water-Parſnep and Water-Creſs, have been often miſtaken for each other, and the error has produced very diſagreeable effects. The beſt ſeaſon for acquiring a knowledge of their differences is when they are in flower, as the plants are then in the fulleſt perfection. The Fools-Parſley is known from the True, by a fence of three, long, narrow, ſharp-pointed leaflets, hanging down under every partial umbel: whereas the fence, in the Garden-

Parſley

Parſley is found at the baſe of the general, as well as the partial umbel, and conſiſts only of a few ſhort folioles, almoſt as fine as hairs. The rank diſagreeable ſmell of the Fools-Parſley, when the ſtem or leaves are bruiſed, is another guide to direct you in knowing it from the True, which at firſt ſight it ſo much reſembles. Hemlock Chervil * is a wild plant, which, notwithſtanding it grows in dry ſituations, ſuch as banks and the ſides of high roads, is of a poiſonous nature, and it not only belongs to the ſame diviſion, but it is of the ſame genus as the Garden Chervil; it is, therefore very liable to be miſtaken for it. The corolla in both is radiate, and the petals notched at the end, the middle flowers are frequently incomplete, and conſequently produce no ſeed. The fruits are of an oblong ſhape. So far they coincide; but the Garden Chervil has the advantage in height, is of a pleaſing aſpect, and is adorned with light-green leaves, whilſt its reſemblance grows lower, and has hairy leaves of a darker colour. As I have told you, that the Creeping Water-Parſnep † has ſometimes been eaten inſtead of the Water-Creſs, of which you are ſo fond, I will acquaint you with their moſt obvious diſtinctions, leſt you ſhould be deprived of the pleaſure of your breakfaſt, from an apprehenſion of being poiſon-

* Scandix. † Sium.

ed. They cannot be confounded when in bloſſom, the Water-Creſs belonging to the cruciform tribe, but as that is not the time for gathering this plant, we muſt look for the difference in their foliage. The winged leaf of the Water-Parſnep is formed of leaflets longer and narrower than thoſe of the Water-Creſs, with edges like the teeth of a ſaw, and terminating in a ſharp point; but if you remark the leaves of the latter, you will find that they have a browniſh tinge, that the leaflets are of a roundiſh ſhape, and particularly the one at the end of the winged leaf, and that the edges are ſmooth, except a few indentures or curvings. Leaving the umbellate kinds to your future inſpection, I ſhall proceed to notice ſeveral trees and ſhrubs which belong to the third order of the fifth claſs. The bloſſom of the Meal * Tree has a very ſmall cup, ſuperior to the ſeed-veſſel, with five teeth; one bell-ſhaped petal, with five hollow clefts turned back, its fruit a roundiſh berry of one cell, concealing a ſingle ſeed as hard as bone. The Guelder Roſe, ſo ornamental to ſhrubberies, with its ſnow-white flowers growing in balls, is a variety of the Meal Tree. The Elder † which I have warned you to diſtinguiſh from the plants of the umbellate tribe, is of this order; its beautiful bloſſoms, nodding like feathers, will afford you

* Viburnum. † Sambucus.

you a ſpecimen of flowers growing in a cyme. There is a kind of Elder with variegated leaves, which have a pretty effect amongſt other ſhrubs. Many parts of the Elder is uſeful. Wine is made both from the flower and the berries, and the root is applied as a medicine. The fourth order contains but two genera, of which the Parnaſſus* is one. This grows wild, but not very commonly, in marſhy places, the leaves that are near the root are heart-ſhaped on long ſtalks, the ſtem leaves ſitting cloſe to the ſtem. The ſeed-bud is open at the top, whilſt the plant is in flower, being deſtitute of either ſhaft or ſummit, the ſtamens turn their lips towards the hole, and ſcatter the duſt of their anthers into it, which renders the ſeeds fertile, and then return to their former ſituation. The petals are white, ſtreaked with yellow, and the honey cups are remarkable for their beauty as well as ſingularity. There are five of them, each hollow, and ſhaped like a heart, ſurrounded with thirteen little ſhafts or pillars, ſet along the edge, and each crowned with a little globe. Thrift †, that pretty pink flower which edges the borders of the kitchen garden, is of the fifth order, having five ſhafts with ſharp ſummits, and five awl-ſhaped ſtamens fixed to the claws of the petals: there are twenty-two ſpecies, in which the cup varies as to ſhape,

* Parnaſſia. † Statice.

but is always of one leaf, dry and ſhrivelled like chaff, its corolla is of five petals, narrow at the baſe but expanded toward the top, and the flowers growing in a round head upon a ſingle ſtalk. Before I diſmiſs this numerous claſs, I muſt preſent you with a plant celebrated for its extenſive utility. Flax * is of Egyptian origin, but has long been naturalized in this part of the world. This ſimple vegetable, of no greater height than twenty inches, is the chief material of the linen manufacture, the fibres of the ſtem, after undergoing various operations, being ſpun into thread, which is afterwards woven into cloth of different qualities; this ſubſtance, when worn out, is converted into paper, by means of mills which grind the rags to a pulp. The ſeeds ſupply birds with food, and yield an oil by preſſure only, that is excellent in diſorders of the lungs; painters and varniſhers are indebted to the oil obtained from Flax Seed; and the cakes, made of the huſks, after the oil is ſqueezed out, are extenſively uſeful to fatten cattle; the very duſt is of value, being found an excellent manure. Were I to enumerate all the purpoſes to which this plant is applied, it would fill a volume, rather than a letter, and lead me far away from the object before us, which reminds me to inform you, that Flax has a five-leafed calyx, and a corolla

* Linum.

a corolla of five petals; the capſule opens by five valves, being divided in the inſide, into ten cells, each containing one ſeed. The bloſſoms are blue, which are produced on an unbranched ſtalk, with alternate lance-ſhaped leaves. Having ſelected a ſufficient number of ſpecimens of the claſs Pentandria, I ſhall cloſe my letter, believing that the objects already deſcribed will furniſh you with ſufficient employment, till I have leiſure to collect farther information, relative to thoſe that are to follow. This fine ſeaſon ſhould encourage you to ſpend a great deal of time abroad. Remember to uſe your eyes, and let none of Flora's beauties eſcape your obſervation. Adieu.

FELICIA.

LETTER XIV.

DEAR CONSTANCE, *Shrubbery, June 1.*

THE claſs Hexandria, or flowers with ſix ſtamens, includes the far greater part of the liliaceous tribe, but do not ſuppoſe that it conſiſts of them alone, other plants are to be found in it,

though comparatively few in number. Our gardens receive many of their moſt ſplendid embelliſhments from the flowers of this deſcription. The gaudy Tulip, with its ſtriped coral of varied hues, produced by the art of the floriſt from a ſingle colour in its natural ſtate, has been ſo highly rated for its beauties by Dutch connoiſſeurs, as to be ſold for one hundred ducats the ſingle root. The Hyacinth of different colours, and delightful fragrance, the whole family of Lillies, the magnificent Amaryllis, the great American Aloe, that riſes to the height of twenty feet, with all the leſſer plants of that denomination, rank among thoſe of the liliaceous kind, with many more remarkable for the delicacy of their form, and the ſplendor of their colours; but as moſt of theſe are of foreign extraction, I ſhall paſs them over as objects of admiration only, and ſearch among the humble plants of our own growth for a few, worthy of minute deſcription; ſome of this family have a calyx, others are entirely without, and the buds of many of them are incloſed in a ſheath or huſk, which burſts as the coral expands: this circumſtance throws them naturally into three ſubdiviſions. Among the plants of the latter, is the elegant Snowdrop *, ſo much valued by thoſe who delight in the return of ſpring, as one of its earlieſt

* Galanthus.

earlieſt harbingers. Its corolla is ſuperior, and conſiſts of ſix white petals, a little tinged with green, of which the three innermoſt are the ſhorteſt, and are ſuppoſed to be the nectary. This beautiful little flower never appears to more advantage, than when it intermixes its bloſſoms with thoſe of the Golden Crocus, which is nearly related to the ſame tribe, by its manner of growth and external ſtructure; the calyx is a ſheath, and the corolla has ſix diviſions, the tube deſcending towards the root; but it is ſeparated from it by the artificial ſyſtem, as it has only three ſtamens and one pointal. Meadow Saffron*, which is very like the Crocus, however belongs to it, and is included in the third order of this claſs. It is found in the month of September in paſtures, with flat ſpear-ſhaped leaves, and pale purple bloſſoms, which are doubled by cultivation, and changed into various colours. But to return to the firſt order, from whence I have wandered a little, for the ſake of uniting the Crocus with the Snowdrop. The Daffodil and the Narciſſus have only one flower, produced from the ſame ſheath; their general characters conſiſt of ſix petals, forming a ſuperior corolla, a funnel-ſhaped honey-cup of one leaf, containing the ſtamens which are fixed to its tube. The Hyacinths, cultivated with ſo

* Colchicum.

much care, are frequently double, and the bloſſoms are of various colours; but whatever pleaſure they yield us, as objects of ſight and ſmell, we muſt reject them for the wild Harebell, in which we ſhall be able to trace their original features, unimproved by the poliſhing hand of art. The Hyacinth in its native ſtate has no empalement, its bloſſom is bell-ſhaped, and of one petal, the border divided into ſix clefts, and turned back; at the point of the ſeed-bud are three pores filled with honey. The modeſt Lily of the Valley* differs from the Harebell, in its ſeed-veſſel, which is a round berry, ſpotted before it is ripe, whilſt that of the Harebell is a capſule. Solomon's Seal is diſtinguiſhed from the Lily of the Valley, by its ſtem being clothed with alternate leaves, whereas the Harebell has a naked ſtalk. The Barberry is a ſhrub that belongs to this firſt order of the ſixth claſs, though it has no pretenſions to range with the liliaceous tribe, its leaves change into thorns. A fine ſwéetmeat is made of its berries, the ears of corn that grow in its neighbourhood never fill, its baneful influence in this reſpect extends ſome hundred yards. The ſtamina are extremely irritable, if the threads are touched ever ſo ſlightly, the tips approach the pointal, and ſcatter the pollen with expanſive force. All the ſpecies of Ruſh

* Convallaria.

Ruſh and ſome others, which are deficient in the corolla, belong to the ſame order. Rice is almoſt the only plant known in the ſecond order of this claſs, and is chiefly produced in the Eaſt and Weſt Indies. The Docks * are a numerous genus, belonging to the third order; their beauty is not attractive, they are known by a cup of three leaves, a corolla of three petals, not unlike the cup, but larger; they have no ſeed-veſſel, but the petals, bending on a three cornered form, incloſe the ſeed, which is triangular. The fifth order contains the Water Plantains †, which are diſtinguiſhed by a cup of three leaves, a corolla of three large, flat, circular petals, greatly expanded, ſucceeded by more than five capſules, each concealing one ſeed. They are found in ditches and other ſhallow waters. The ſeventh is the ſmalleſt of all the claſſes: I ſhall preſent you with but one ſpecimen of it. The cup of the Winter green, or Chickweed, has ſeven ſpear-ſhaped leaves, the bloſſom is formed like a ſtar, and, though divided into ſeven ſegments, is of one petal. It has a globular ſeed-veſſel, which is a berry not unlike a capſule, of one cell, with a very thin coat, opening by ſeveral ſeams. Although ſeven is the general number found on this plant, it ſometimes deviates from it. In one ſpecies of it, the parts of the fructification are

* Rumex. † Aliſma.

defended againſt the injuries of rain, by the cloſing of the petals, and hanging down of the flowers at its approach. In the eighth claſs are found the Willowherbs *, generally characteriſed by a ſuperior cup of four tapering coloured leaves, a corolla of four circular expanding petals, the ſummit of the pointal divided into four clefts, a very long capſule of four cells, containing numerous ſeeds crowned with a feather, doubtleſs to waft them to a diſtance, when mature. In ſome ſpecies the ſtamens and pointals are upright, but lean towards the lower ſide of the bloſſom in others. The ſhape of the leaves is another diſtinction that marks the different ſpecies, as well as their manner of growth; the ſmall-flowered hairy Willowherb has ſpear-ſhaped, woolly, toothed leaves, growing oppoſite to one another. The great flowered Willowherb, vulgarly called Codlings and Cream, has its leaves running along, and embracing the ſtem; the ſhoots have a very delicate ſmell, but it is loſt almoſt as ſoon as they are gathered. Theſe plants are generally found in marſhy places, or on the banks of rivers. Heaths and commons, eſpecially in the northern counties of England, produce the Whortle †. The moor-game live upon the berries in autumn; ſome kinds of them are alſo eaten freely by the common

* Epilobium. † Vaccinium.

mon people: they make pleaſant tarts or jelly, and are flavoured much like the American Cranberry. They are generally known by a very ſmall cup, a bloſſom of one petal, bell-ſhaped, with four clefts rolled backwards. The ſeed-veſſel is a roundiſh berry with a hollow dimple, divided into four cells, in which are found a few ſmall ſeeds. Some ſpecies are evergreen, others loſe their leaves on the approach of winter, which naturally throws them into two diviſions. The Black-worts, or Wind-berry, and the Great Bilberry Buſh belong to the latter; their fruit ſtalks ſupport a ſingle flower, but the leaves of the Black-worts are toothed like a ſaw, and the bloſſom divided into five clefts, whilſt the Great Bilberry Buſh has oval leaves with ſmooth edges. Numerous ſpecies are contained in the Heath* genus, the beauty of the foreign ſorts has introduced them into our greenhouſes, where they do not ſhrink from a compariſon with the brilliant productions of diſtant countries collected together. Many of our own would be valued as beautiful, were they leſs common, but ſuch is our perverſeneſs, that whatever is difficult to be obtained, we eſteem in proportion to that difficulty. They moſtly agree in theſe characters—a calyx of four leaves, upright, coloured, incloſing the germ, a bloſſom of one petal,

* Erica.

petal, cut into four ſegments, the figure of which varies between egg-ſhaped and oblong, the threads of the ſtamens ſtanding on the receptacle, tips cloven at the point, and a capſule of four cells. The ſtamens in ſome ſpecies are longer, and in others ſhorter than the bloſſom. Common Heath has the tips incloſed within the bloſſom, which is bell-ſhaped; its leaves are oppoſite and arrow-ſhaped. In our happy climate, this plant is but little regarded, except for its honey, with which it ſupplies the bees in abundance. It is only uſed for inferior purpoſes, ſuch as making beſoms and firing for ovens; but in the barren highlands of Scotland it is of extenſive uſe; the poor cottagers make the walls of their wretched cabins of alternate layers of Heath, and a kind of mortar made of black earth mixed with ſtraw, and the roofs are thatched with it. So deſtitute of domeſtic comforts are thoſe poor people, that they are contented with beds formed of the ſame material; they contrive to make them ſoft enough to ſleep upon, by placing the roots downwards, and the tops only appearing at the ſurface. Mrs. Snelgrove tells me, that as we advance in the ſcience of botany, we muſt not confine our information to the form of plants, or the number of their parts, but ſhould extend our reſearches to the purpoſes to which they are applied; a ſtudy that will ſupply

us

us with much useful knowledge and entertainment at the same time. The stalks of the cross-leafed Heath are shrubby, and rise from nine to twelve inches high; the leaves are fringed with hairs, and grow in fours, like a cross, pressed close to the stalk, each of the hairs at the edge of the leaves appears, in a magnifying glass, to terminate in a small round globule. The corolla is nearly oval, of a pale red colour, forming a little head, one flower hanging down over another. The tips are inclosed in the blossom. The Mezereon* is included in the same order with those already mentioned, in the class Octandria, the early blossoms of which adorn our shrubberies in February. It has no cup, but a funnel-shaped corolla of one petal, inclosing the stamens, and the border cut into four segments. The fruit is a berry, in which is found a single seed. The sort commonly cultivated, is distinguished by its flowers growing by threes, from the same joint, sitting upon the stem. The leaves are spear-shaped. The buds at the ends of the stalks produce leaves, those on the sides flowers, which are so thick set, as to make the branches appear of a beautiful rose colour. There is another species that bears yellowish green blossoms, and is valued as an evergreen. The third order contains a numerous genus, among

* Daphne.

among the ſpecies of which is the family of Snakeweeds *. They concur in having a turban-ſhaped cup, coloured within, and divided into five ſegments, which, if you pleaſe, you may term the corolla, and then the cup will be wanting. The flowers of the greater Biſtort grow in a ſpike on an undivided ſtem. The lower leaves are ſomewhat heart-ſhaped, and continued down the ſtalk. The root is one of the moſt powerful vegetable aſtringents. Knot-Graſs is found commonly by road ſides and corn fields. It has a trailing ſtem, and the flowers are produced at the baſe of the leaves, which vary much in form, but are generally inclined to ſpear-ſhaped. The ſeeds ſupply food to great numbers of ſmall birds. If my letters are too long, tell me ſo, and I will correct my prolixity, or at leaſt endeavour to reſtrain it within moderate bounds. But when I am writing to my dear Conſtance, the time is inſenſibly beguiled, and I forget the neceſſity of concluding. Moſt tenderly your

FELICIA.

LETTER

* Polygonum.

LETTER XV.

DEAR CONSTANCE, *Shrubbery, June 6.*

THE pleaſure I feel in writing to you, is the cauſe that I never want leiſure for this agreeable employment; if my taſks do not afford me time, I can readily ſteal an hour from thoſe allotted to ſleep or diverſion. I am fully convinced that inclination is always wanting, when one friend cannot find opportunity to write to another. The Flowering Ruſh * is the only plant, found wild in England, that belongs to the claſs Enneandria. It grows in the water, and has a round ſmooth ſtalk, which riſes from one to ſix feet high, according to its ſituation; at the top of which is a head or umbel of bright red flowers, ſometimes not leſs than thirty, ſurrounded at the bottom of the umbel by an involucre of withered ſheaths; three ſhort leaves form the cup, the corolla has ſix petals. It has ſix pointals, and ſix long tapering capſules of one valve, opening inwards, filled with numerous ſmall ſeeds. This plant, ſo ſtately from its height and its beautiful tuft of flowers, would make a charming appearance in canals or other pieces

* Butomus.

pieces of water, if introduced and cultured by art: and, as it is ſo hardy as to defy the cold of Lapland, there would be no reaſon to fear the utmoſt ſeverity of froſt. Many remarkable foreign plants belong to this claſs, it will be ſufficient to enumerate a few of them. Bay, Cinnamon, Caſſia, Camphor, and Saſſafras, are comprehended under one genus, and are moſt of them uſeful for medicinal purpoſes. Rhubarb, ſo well known as a ſtomachic, is alſo of the ſame claſs, and is ſucceſsfully cultivated in this country; but as its extraction is foreign, it does not come within my plan to give a further account of it. The tenth claſs will ſupply us with a greater variety; Linnæus has conveniently divided the firſt order into ſuch as have corollas of many petals, thoſe of one petal, and ſuch as are without any. The firſt of theſe are again divided into ſuch as have irregular, and thoſe which have equal corollas. Birdſneſt * has no empalement, unleſs you give that name to the five outermoſt coloured petals of the corolla, which are hunched at the baſe, and have a cavity for honey on the inſide; it has five others, all of an oblong ſhape, upright, and nearly parallel. The ſeed-veſſel is pentangular, and egg-ſhaped, with five valves containing many chaffy ſeeds. Theſe are the characters by which the terminating

* Monotropa.

ing flower is known; but it is worth your notice to remark, that if there be any lateral flowers, you muſt ſubtract one-fifth of every part of the fructification. This is the caſe with many other plants, which makes it neceſſary to examine the central or principal flower. In ſome plants the ſide flowers have a fifth more of the parts than the primary one. The Strawberry Tree * is a beautiful ſhrub, bearing bunches of white flowers of the preſent year, whilſt the red berries of the laſt ſeaſon remain pendant upon it. It grows without culture in the weſt of Ireland, near the Lake of Killarney, on barren lime ſtone rocks, and is eſteemed a great ornamenn to the romantic views of that delightful ſituation. It is known by a very ſmall cup, an egg-ſhaped corolla of one petal, with five ſmall reflected ſegments; the ſeed-veſſel is a roundiſh berry, with five cells filled with ſmall ſeeds, as hard as bone. The ſtem is woody, and the leaves ſmooth, but toothed at the edges. In one ſpecies the ſtems trail, and the leaves are wrinkled, with black berries ſitting upon a very ſmall red cup. The ſecond order preſents us with the Saxifrages † a numerous genus, of which the pyramidal ſedum is one, which ſtood laſt ſummer on the hall chimney-piece, whoſe beautiful cone of white flowers remained ſome weeks in bloſſom. They

are

* Arbutus. † Saxifraga.

are diſtinguiſhed by a calyx divided into five parts, a coral of five expanding petals, narrow towards the baſe, a capſule of one cell, terminating with two beaks, or ſharp points, in which are lodged many minute ſeeds. The white Saxafrage has a beaded root, compoſed of a number of little grains or bulbs, connected together in cluſters by the fibres. The ſtem is hairy, a little branched, and grows about a foot high; the leaves next the root, placed on long foot-ſtalks, are kidney-ſhaped; the flowers terminate the ſtalk in ſmall branches, the coral is white, ſtreaked with yellowiſh veins. It thrives beſt in gravelly ſoils, flowers in May, and produces its ſeeds in the month following. The genus Dianthus includes the rich Carnation, with its ſpicy odour; the modeſt Sweet William, and the whole tribe of Pinks in all their varieties. Charming as theſe objects are rendered in the garden, by their colours and fragrance, as on former occaſions, we muſt have recourſe to the fields, in ſearch of ſome of the ſpecies that are to be found there, in a ſtate of nature. They agree in having a cup formed like a cylinder, toothed at the mouth, and encompaſſed at the baſe with four ſcales. A corolla of five petals, with claws as long as the cup, fixed to the receptacle, and ſcolloped at the edges; a cylindric capſule of one cell, opening at the top in four

four directions. The principal thing to be obſerved in aſcertaining the ſpecies of this beautiful genus, is the manner of flowering. The Sweet William has its flowers incorporated, or one head formed of many ſingle flowers. Pinks have ſeveral flowers proceeding from the ſame ſtem, not in bunches, but ſolitary or ſeparate. One ſpecies is known by a low herbaceous ſtem, ſupporting a ſingle flower. The form of the ſcales is another circumſtance, which diſtinguiſhes the ſpecies. In the Sweet William they are as long as the corolla, thoſe of the Carnation and Pink are very ſhort. The bloſſoms of the wild Childing Sweet William expand about eight in the morning, and cloſe about one in the afternoon. What is the cauſe of this peculiarity? Many other plants ſhut up their bloſſoms at a particular hour, doubtleſs this inſtinct is beſtowed on them for ſome wiſe purpoſe of preſervation, which is worthy the attention of botaniſts to diſcover. The Sandworts * and Stitchworts are found in the third order, and have a great ſimilitude to each other. They both have a capſule with one cell, in the former the petals are of one piece, but in the latter they are divided almoſt to the baſe. The genera of Campion † and Catchfly † have alſo a near reſemblance, the capſules of both being divided into three

* Arenaria. † Lychnis

three cells, and their petals cloven; but the Catchflies are diſtinguiſhed by the honey-cup, which is compoſed of two little teeth at the neck of each petal, forming a kind of crown at the mouth of the tube. All four have five petals in the corolla. Among the plants of the fourth order are found the Stonecrops *, ſo called from growing on walls, roofs of houſes, or rocks, where there appears ſcarcely any mould to nouriſh them; one ſpecies, the Sedum Acre, will flouriſh when hung up by the root, a proof that it receives its principal ſuſtenance from the air; which is the caſe with moſt of the ſucculent plants. They are generally known by a calyx cut into five ſegments, a corolla of five petals, five honey-cups, conſiſting of a ſmall ſcale, placed at the baſe of each germen. Five capſules, with as many pointals, and twice the number of ſtamens, are characteriſtic marks of the claſs and order. The different ſpecies of Cuckow-flower, or Lychnis, agree in having a tubular cup of one leaf, a corolla compoſed of five petals, frequently cloven, and a capſule with one cell and five valves. The names of Meadow Pink, Wild Williams, Ragged Robin, and Cuckow-flowers are applied to one ſpecies, which abounds in moiſt meadows, and is entitled, for its beauty, to a place in our gardens; the ſtems are trailing, but

* Sedum.

but upright, when in flower; the petals are of a fine red, and deeply jagged at the edges. The appearance of the bloſſoms about the time of the cuckow's return, has probably given riſe to its laſt name. In the Campion Cuckow-flower the ſtamens grow upon one plant, and the pointals upon another. The Clammy Cuckow-flower has undivided petals and capſules with five cells. The Woodſorrel* is generally found in woods and moiſt ſhady lanes; and, contrary to expectation, the ſame plant thrives on mountains; which is accounted for, by an obſervation of Linnæus, that the clouds, reſting upon the tops of mountains, produce the ſame ſtate of atmoſphere as fogs in low marſhy ſituations. Breakfaſt bell rings, and I muſt obey its call. Farewell.

FELICIA.

LETTER XVI.

DEAR COSNTANCE, *Shrubbery, June* 10

A NEW riſen ſun, ſhining into my chamber windows, has awakened me rather earlier than uſual, but I do not repine at being diſturbed, as it

* Oxalis.

it affords me a convenient opportunity of renewing my ſubject. The eleventh claſs, Dodecandria, will preſent us with ſome difficulties, but they may be overcome by patient attention. The number of ſtamens is by no means certain: all plants, that have from twelve to nineteen incluſive, belong to it; provided they are fixed to a receptacle, which is an important circumſtance to be obſerved, as the number of ſtamens cannot be relied upon. Some plants have leſs than twelve, and others more than nineteen. Looſeſtrife * has a cylindrical cup of one leaf, with twelve teeth, incloſing the germ, a corolla of ſix petals, fixed by the claws to the diviſions of the cup, a capſule of two cells, in which are lodged many ſmall ſeeds. Its purple ſpikes adorn the banks of rivers in July; there is a variety with a ſix-cornered ſtem, and the leaves growing three together; this ſpecies has twelve ſtamens, but in ſome others there are not ſo many. In the common Agrimony †, the number of ſtamens is equally uncertain: you may find twelve in ſome plants, ſometimes ten, and frequently ſeven. It has a ſmall calyx, cut into five ſegments, ſurrounded by another cup, a corolla of five petals, growing to the cup, and one or two roundiſh ſeeds in the bottom of the calyx; the ſtem leaves are winged, the odd one at the end

* Lythrum. † Agrimonia.

end ſupported upon a leaf-ſtalk. The ſeeds are covered with briſtles, and the yellow bloſſoms grow in ſpikes. The third order conſiſts of two genera, Yellow-weed* and Spurge†, both very difficult to aſcertain, on account of the irregularity of the parts, with reſpect to figure and number. The eſſential character of the firſt is marked by the petals with three clefts, one of them containing the honey-cup in its baſe, and a capſule of one cell, always open; the cup is of one leaf, divided into ſegments, two of them more gaping than the reſt, being diſtended by the honey-cup petals. Dyers Weed is found on barren ground, or on walls, and affords a moſt beautiful yellow dye for cotton, woollen, ſilk, or linen; the yellow hue of the paint, called Dutch Pink, is procured from the ſtems and roots of this plant, in which the quality of tinging reſides. The ancient Britons are ſuppoſed to have ſtained their bodies with the juice of it. The cup is cut into four ſegments, the petals are three, the upper one, bearing the honey-cup, divided nearly half way into ſix parts. The petals that grow on the ſides, and oppoſite to each other, have only three ſegments; and ſometimes two very ſmall entire petals grow below them. The flowers blow in a nodding ſpike, which follows the courſe of the ſun, turning towards it,

* Reſeda. † Euphorbia.

it, when it rises, and bending after it, till it sinks beneath the western horizon. At night it points to the north. A cloudy sky has not influence to prevent the faithful attachment of this flower to the sun. Spurge has a cup of one leaf, cut into four (and in some) five segments, the corolla varies in like manner with respect to the number of its petals, which are in some four and in others five, hunched thick, irregularly situated, and fixed by their claws to the edge of the cup. The stamens are twelve or more, appearing at different periods. The seed-vessel is a capsule, that is either smooth, hairy, or warty, consisting of three cavities united, each containing one seed, and opening as with a spring even while they are green. The numerous species of this genus are conveniently divided into, those that bear flowers in rundles, with three divisions; others that have rundles, with five divisions; and those whose rundles have many divisions. Most of the Spurges are filled with a milky gummy juice, which is very sharp and corrosive. There is a great resemblance between some of the plants of this natural family; two of them, that have a strong similitude to each other, are frequently cultivated in gardens; but a close examination will teach us to distinguish the one from the other. The leaves of the Sun Spurge are notched or serrated at the edges, but

in

in the ſmall garden Spurge they are entire. The petals, or nectaria, of the former are round and even at the edges, whilſt thoſe of the latter are armed with two little horns. The rundles of the ſmall Garden Spurge have three diviſions, which are ſeparate in pairs, thoſe of the Sun Spurge have five diviſions, with five leaves, which divide again into three clefts, with three leaves, and then fork into pairs. The ſame number prevails in every part of the bloſſom of the Houſeleek*, the diviſions of the cup, the petals of the corolla, the ſtamens, ſeed-buds, and capſules, vary from ſix to twelve: this genus has a near affinity to the Stonecrop, but differs from that, in always having more than five petals. It generally grows on walls or the roofs of houſes. Feeling an inclination for exerciſe, I ſhall lay my pen aſide till a future occaſion. My warmeſt affection attend you, and thoſe you are with.

FELICIA.

F LETTER

* Sempervivum.

LETTER XVII.

DEAR CONSTANCE, *Shrubbery, June* 15.

THE ſatisfaction you kindly expreſs, at my feeble attempts to amuſe you with the reſult of my botanical rambles, encourages me to proceed to the claſs Iſocandria, in which the number of the ſtamens is not ſo much to be conſidered, as their ſituation. The claſſic character, which diſtinguiſhes it, both from the claſs laſt deſcribed, and that which will ſucceed, is, that the ſtamens proceed directly from the ſides of the cup, or united with the bloſſom; but not from the receptacle, as is common in other claſſes. The petals alſo are fixed to the ſides of the cup by their claws, and the cup conſiſts of one leaf, which is not flat, but hollow. The plants of this claſs form a natural one, the fruits of which are pulpy and eatable. The Apple*, Pear*, Cherry, and Plum, being of the number, I would not have you infer from this, that it is confined to trees and ſhrubs, for there are many herbs that find a place in it. The Prune, a genus of the firſt order, compriſes the Cherry, Plum, and Sloe; they agree in the following characters,

* Pyrus

characters: a cup of one leaf, bell-shaped with five clefts, five hollow expanding petals, fixed to the cup, from twenty to thirty stamens standing also on the cup; the seed vessel is a pulpy fruit, including a nut or stone which is the seed. The flowers of the Birds cherry grow in bunches, but those of the Black-cherry are produced in rundles, on very short fruit stalks; the leaves are glossy and doubled together. It is found in woods and hedges, and abounds particularly in some parts of Hertfordshire. The Bullace, from which the cultivated Plums derive their origin, has its fruit-stalks either in pairs or solitary, and one species has thorny branches. If you should be induced to gather the fruit of those trees, with the expectation of enjoying the rich flavour of their congeners in our orchards, you will be greatly disappointed, particularly in the wild plum which are acid and ungrateful to the taste; cultivation bestows on them size and sweetness; the art of budding or grafting them has produced a great many kinds, distinguished by their peculiar colour, shape, and flavour. The second order contains but one genus, the Hawthorn *; the characters in which the different species concur, are a cup, divided into five parts, sitting on the top of the germ, a corolla composed of five petals, and a fleshy

* Cratægus.

fleſhy berry containing two ſeeds. The leaves of the Whitebean tree are egg-ſhaped, and jagged, their under ſurfaces downy. The Wild Service Tree* has heart-ſhaped leaves, with ſeveral angles. The leaves of the White Thorn are blunt, with three indentures: it frequently deviates from the general character, by having only one pointal and one ſeed in each flower. The principal diſtinction between the ſhrubs of the ſecond and third orders, conſiſts in the number of the pointals. The fourth order, known by its five pointals, comprehends three genera, the Medlar †, Apple, (in which Pears are included) and Meadow-ſweet. Their common characters are, a five-toothed cup, and a corolla of five petals. Their diſtinctive marks conſiſt in the diverſity of their fruits: in the firſt it is a berry, in the ſecond an apple, and in the third a ſet of capſules. The Roſe ‡, ſo univerſally admired, as the queen of flowers, belongs to the fifth order; the different ſpecies agree, in a cup of five diviſions, a corolla of five petals, and a turbaned-ſhaped fleſhy berry, formed out of the cup, and terminated by the diviſions of it, incloſing ſeveral oblong hairy ſeeds, adhering to the cup on all ſides. Their diſtinctions chiefly conſiſt in the form of the fruit, whether inclining to round or oval, the ſituation of the ſpines, on

* Sorbus. † Meſpilus. ‡ Roſa.

on the different parts of the ſhrub, and the manner of flowering. This general favourite has received all the advantages which art can beſtow on it, the varieties are numerous, produced by cultivation; ſcarcely any garden is ſo mean as to be deſtitute of a Roſe. The Strawberry*, of which ſo many kinds are produced by the ſkill of the gardener, has the cup divided into ten ſegments, but the number of the petals is only five; the ſeeds are ſcattered upon the ſurface of the receptacle, commonly called a berry. Having come to the concluſion of this claſs, I ſhall likewiſe cloſe my letter; not that I have exhauſted all the ſpecimens it affords, but have deſcribed thoſe that appear to me to have the beſt claim to your notice. Adieu!

FELICIA.

LETTER XVIII.

FREQUENTLY am I tempted abroad, when indolence would keep me within doors, in ſearch of ſpecimens for my next letter; thus, many

 advantages

* Fragaria.

advantages refult from the purfuit of one object. In the thirteenth clafs, Polyandria, the ftamens are numerous, fpringing from the receptacle, along with the pointal; which is a material diftinction from thofe that belong to the former clafs, which I have remarked to be always attached to the cup. The objects of our prefent conſiderations are, many of them pleafing to the eye, but unlike thofe delicious and wholefome fruits, lately deſcribed; in their qualities, being poiſonous to the human conſtitution. In the firſt order is found the Poppy*, which has a cup of two leaves, which falls off as the flower expands, a corolla of four petals, and a capſule of one cell, crowned with the ſummit, and opening beneath it with many holes; through theſe the numerous ſmall ſeeds find a paſſage. The ſeed-veſſel in ſome ſpecies is round, in others oblong; it is ſmooth in ſome kinds, and beſet with ſtrong hairs in others; the number of rays in the ſummit is not always the ſame. Opium, ſo celebrated for its faculty of ſtilling the ſevereſt pain, is made from the milky juice of the Wild Poppy. The ſame order contains the Water Lily†, whoſe beautiful flowers adorn ſlow rivers and ponds in the months of July and Auguſt, The calyx is compoſed of four large leaves coloured on the upper ſurface, the petals of the corolla

* Papaver. † Nymphæ.

corolla are numerous, frequently as many as fifteen; it has a large egg-ſhaped ſeed-bud, a circular flat ſummit, not ſupported by any ſhaft, but ſitting, and marked with rays. There are two ſpecies, the flowers of the firſt grow on fruit-ſtalks, the bloſſoms are yellow. Thoſe of the ſecond open about ſeven in the morning, and cloſe about four in the afternoon, and then lie on the ſurface of the water. The ſummits are numerous and placed in a circle, correſponding in number with the cells in the ſeed-veſſel. The corollas are a delicate white. As ſoon as theſe ſplendid water-flowers have perfected their fructification, by the abſorption of the pollen by the pointal, their long ſtalks, which always grow in proportion to the depth of the water, in order to raiſe the corollas above it, refuſe their ſupport, and the flowers ſink down many feet beneath the ſurface. There is a remarkable contrivance exhibited in the proceſs of the fructification of the Valliſeneſia of Italy, alſo a water-plant worth mentioning. The ſtamens and pointals are diſpoſed on different plants, whilſt both are in bloſſom; the anthers fall off, and floating among the piſtiliferous flowers, fertilize them with their pollen. A cup of five leaves, two ſmaller than the reſt, a corolla of five petals, and a capſule, covered by the cup, are the characteriſtics of the genus Ciſtus, to which many beautiful ſhrubs

belong, though ſome of them are herbaceous. In different kinds, the corollas are either purple, white, or yellow. The Lime* very ſeldom brings more than one ſeed to perfection, and this puſhes aſide the others that are barren, ſo that a careleſs obſerver might ſuppoſe that the capſule had but one cell, whereas it has five. The Larkſpur†, belonging to the third order, the Columbine ‡ to the fifth, and the Hellebore § to the laſt, with ſome others, unite in having ſeveral capſules joined together, no cup, a corolla of five petals, and a numerous ſet of ſtamens. The differences of their honey-cups, which are remarkable, ſerve to point out their generic diſtinctions; the Larkſpur is known from its companions, by three capſules, and a honey-cup that is cloven; the front ſtanding in the midſt of the petals, and turning backwards like a horn or ſpur. Columbine has five capſules of a cylindrical form, and five equal honey-cups, ſhaped like a cornucopia, ſituated alternately between the petals. Cultivation frequently encreaſes the number of theſe nectaries, and diminiſhes that of the petals: when they grow wild, the bloſſoms are blue, but are found in various hues in gardens. Hellebore has ſeveral capſules, and many very ſhort honey-cups forming a circle round the outſide of the ſtamens; their ſhape reſembles

* Tilia. † Delphinium. ‡ Aquilegia. § Helleborus.

bles a tube, with the mouth divided into two lips. After ſo many ſimilar examples, you will not be ſurpriſed to hear, that we owe the various-coloured Anemonies, that adorn the flower-beds early in ſpring, to two ſpecies only; both found commonly in woods, in the month of April; this plant is diſtinguiſhed from its rival, the Ranunculus, by the want of an empalement, which, in the latter, conſiſts of five leaves; but the eſſential character of this genus is marked by the honey-cup; in ſome ſpecies it is a naked pore, in others it is ſurrounded by a cylindrical border, and it is ſometimes cloſed by a ſcale indented at the end. There are three kinds of Butter-cups, which are ſpecies of the Ranunculus, which give a golden hue to our meadows by the brilliancy of their yellow bloſſoms, one of them has a bulbous root, ſomething like a turnip, the leaves of the cup bent backward, the fruit-ſtalks furrowed, each ſupporting a ſingle flower. The ſecond ſort has an open cup, and throws out creeping ſuckers; the laſt grows taller than the other two, its cup is open, and the fruit-ſtalk round. The yellow colour of butter is attributed to the cows feeding on this plant, but, like many commonly received opinions, it is probably an error, as it is ſo acrimonous, that cattle ſeldom eat it, unleſs preſſed by hunger. Although my letter is not ſo long as uſual, I am inclined to cloſe it,

with an account of the ſpecimens of the claſs Polyandria, thinking I ſhall preſerve greater perſpicuity, by confining the ſubject of one letter to the ſame claſs. With all ſiſterly affection I am yours,

FELICIA.

LETTER XIX.

DEAR CONSTANCE, *Shrubbery, June* 29.

THE eſſential character of the fourteenth claſs, Didynamia, conſiſts in four ſtamens to each flower, one pair ſhorter than the other; the ſhorteſt pair grow together, and adhere to the ſhaft of the pointal. The orders are not diſtinguiſhed, as in the former claſſes by the number of the pointals, becauſe none of the flowers have more than one, which, with the ſtamens, is incloſed by an irregular corolla of one leaf. The manner in which the ſeeds are diſpoſed, is the circumſtance upon which the reſpective orders depend. The firſt, called Gymnoſpermia, has four naked ſeeds fixed to the bottom of the cup, without

out any ſide veſſel. The other (for there are but two) denominated Angroſpermia, has the ſeeds included in a capſule. The firſt order contains thoſe plants that grow in whorls, moſt of them have a ſquare ſtalk, and their leaves are produced in pairs. The perſonate flowers are comprehended in the ſecond: but its diſtinctive character reſts upon the ſeeds being contained in a capſule. The conſtruction of theſe flowers, in general, is curiouſly adapted to preſerve the tips of the ſtamens from the injuries of the weather, as alſo to convey their duſt to the ſummit of the pointal, which is neceſſary to render the ſeeds fertile. They grow nearly upright, but bend a little from the ſtem, by which attitude the upper part of the corolla ſhelters the parts of the fructification. None of theſe plants are poiſonous, but many of them are admired for their odoriferous ſmell and kitchen uſes, as well as for the medicinal qualities which ſome of them poſſeſs. A cup, divided into five clefts, is a circumſtance in which the following plants of this order generally agree: Motherwort *, Ground Ivy †, Mint ‡, Germander §, Bugle ‖, Betony ¶, Dead Nettle **, Catmint ††, Henbit ‡‡, Horehound §§; but Thyme ‖‖, Self-heal,

* Leonorus. † Glechoma. ‡ Mentha. § Teucrium. ‖ Ajuga. ¶ Betonica. ** Galeopsis. †† Nepeta. ‡‡ Ballota. §§ Marrubium. ‖‖ Thymus.

heal *, Marjoram †, Baſil‡, Balm-leaf §, and Calamint ‖ have their calyxes cleft into two parts. Small ſwellings are frequently found upon the leaves of the Ground Ivy, which are occaſioned by an inſect; if opened, they are obſerved to be compoſed of many cells. In Mint, the ſtamens are diſtant, upright, and one pair longer than the other; but thoſe of the Water-Mint are all nearly of the ſame length. The upper lip of the bloſſom of the Germander is deeply divided, and the parts gaping widely aſunder, give it the appearance of wanting that part of the corolla. The flowers of one ſpecies of the Bugle grow in the form of a four-ſided pyramid beſet with hairs. Betony has the upper lip circular, entire, flat, and upright; the lower one divided into three ſegments; the middle ones notched at the end. Wood Betony has the root-leaves on leaf-ſtalks, the others heart-ſhaped and ſitting cloſe to the ſtem, the flowers grow in an interrupted ſpike. The red Dead Nettle, though a weed regarded with contempt, is a pleaſing ornament to the banks of ditches in the early part of ſummer. Its bloſſoms, of a reddiſh purple, grow in whorls, conſiſting of many flowers, on the top of the ſtamens, which being interſected with green leaves, gives it a pretty appearance.

* Prunella. † Origanum. ‡ Clinopodium. § Melittis. ‖ Meliſſa.

appearance. The conſtruction of the cup in the Hooded Willowherb is deſerving of peculiar remark: the rim is almoſt entire, covered by a ſcale lying over it like a lid, when the bloſſom falls off, the cup cloſes upon the ſeeds, which would remain ſhut up without poſſibility of eſcape; but the cup withers and divides into two different parts, and by that means affords the ſeeds an opportunity of falling to the ground, and producing young plants the next ſeaſon. Thyme is another of thoſe which have the cup bilabiate, or cloven into two lips; the ſtems of the Common Thyme are woody; the Baſil Thyme is diſtinguiſhed by the middle ſegment of the lower lip of the corolla being notched, and marked with a raiſed white ſpot in the ſhape of a creſcent. The generic character of Self-heal, conſiſts in its forked ſtamens, the tips fixed to the threads beneath the top, and adhering only to one of the diviſions of the fork. In open ſunny ſituations, it trails; but grows upright, a foot high, in woods. Marjoram is known by a ſpiked fence. The flowers grow in roundiſh ſpikes, the leaves oval, and pointed are produced on leaf-ſtalks, the bloſſoms are purple. The whole plant is a warm aromatic, and is found among brambles and hedges in the month of July. Let us proceed to the ſecond order, which you may recollect is diſtinguiſhed from the

the firſt, by the ſeeds of all the genera being incloſed in a pericarp or capſule. The number of ſegments in the cup varies; in ſome, it is divided into two parts, in others four, and in many five. The corollas of the firſt order are almoſt all of them labiate or ringent, but in thoſe of the order under notice, many of them are perſonate, or have the lips cloſed. Broomrape * has a cup, with either two or five clefts, a gaping corolla, with four ſegments nearly equal, and a gland at the baſe of the ſeed-bud, for the purpoſe of ſecreting the honey. A downy undivided ſtem, and the ſtamens appearing above the bloſſom, diſtinguiſh the common kind. Toothwort †, Paintedcup ‡, Eyebright §, Rattle ‖, and Cowwheat ¶ are among thoſe whoſe cups are cloven into four ſegments. The capſule of the firſt is roundiſh, but terminates in a ſmall point, it has one cell and two elaſtic valves, ſurrounded by the cup, which is large and expanding. The Painted cup is diſtinguiſhed by its coloured cup from the Rattle, the Eyebright, and the Louſewort, between which it forms a ſort of connecting link. The Yellow Rattle has the edges of the capſule bordered with a kind of margin, and the ſeeds incloſed in a looſe membrane; when they are ripe they make a rattling noiſe in the capſule.

* Orobanche. † Lathræa. ‡ Bartſia. § Euphraſia. ‖ Rinanthus. ¶ Melampyrum.

capſule. There is a variety with very narrow leaves, the bloſſoms of which are yellow with purple lips. The ſtalk of the Eyebright is much branched and ſquare, the branches oppoſite to each other, the leaves ſitting on the ſtem, thoſe neareſt the flowers ſometimes purpliſh; the flowers of a duſky red, growing in ſpikes, inclined all one way, and nodding at the top. The tips of the ſtamens are pointed with a thorn or ſpine, at the baſe of the lower lobe, and the capſule is divided into two cells. The corolla of the Figwort * has a large globular tube, with a very narrow border, divided into five ſegments; the two upper ones erect, and larger than the reſt, thoſe on the ſides ſpread open, and the lower one turned back; in ſome ſpecies, there is another ſmall ſegment, lying like a flap under the uppermoſt diviſion. The common yellow Toadflax † grows very commonly upon banks by road ſides, which it embelliſhes with its beautiful heads of flowers, growing upon an erect ſtalk, thickly beſet with long narrow leaves of a bluiſh colour; the under lip of the corolla is hairy within, and, by projecting, cloſes the mouth, the chaps are orange coloured, but the reſt of a pale yellow, the bloſſom terminates in a long ſpur. Although the Toadflax has great claim to admiration for its beauty, it is far excelled

* Scrophularia. † Antirrhinum.

celled by the Purple Foxglove *, which is one of the moſt ſplendid flowers that grow wild in this country. The ſtem riſes from three to ſix feet high, and is adorned with pendulous bell-ſhaped flowers, hanging one above another in a very long ſpike: they are of a fine purple, elegantly mottled withinſide with ſpots like eyes; the ſegments of the calyx are of an oval pointed ſhape, and the leaves large and wrinkled. Mrs. Snelgrove waits for me, to accompany her to gather flowers, to fill the vaſes in the hall. I ſhall be no longer confined to the humble productions of the field or the hedge, but ſhall indulge my taſte, in compoſing a garland from among the richeſt of Flora's beauties. Adieu! Adieu!

FELICIA.

LETTER XX.

DEAR CONSTANCE, *Shrubbery, July 1.*

WITH pleaſure do I retire from other company, to devote an hour to the agreeable employment of chatting with you, and renewing botanical

* Digitalis.

nical topics. Suppoſe me ſeated in our dreſſing room, with many ſpecimens before me of the claſs Tetradynamia, which is known by the ſame number of ſtamens on the ſixth claſs, in which they are all nearly of equal length: but, in the ſixteenth, which we are now going to examine, four of them are longer than the other two. The form of the ſeed-veſſel divides the plants of this claſs into two orders; the firſt called Siliculoſa, compriſes thoſe that have a ſhort roundiſh pod or pouch for a ſeed-veſſel; frequently furniſhed with a ſhaft, in ſome kinds as long as the pouch itſelf. This order is naturally ſubdivided into thoſe which have a notch at the top of the ſilicle or pouch, and thoſe which are entire. In the ſecond order, called Siliquoſa, the ſeeds are contained in a long ſlender pod. The natural characters of theſe flowers correſponds ſo exactly with my deſcription of the Stock Gilliflower in a former letter, that I ſhall only refer you to that, without enlarging on particulars, and teaſing you with a repetition of what I have already told you. Whitlowgraſs*, Awlwort†, Camline‡, and Creſſet§, are among thoſe which have the ſeed-veſſel entire; the firſt has its ſeeds contained in a ſhort oval flat pod, without any ſhaft: it is a diminutive plant, and flowers very early. Awlwort has an egg-

* Draba. † Subularia. ‡ Myagrum. § Vella.

egg-ſhaped pouch furniſhed with a very ſhort ſhaft. It is found at the bottom of large lakes. Camline, called by the country people Gold of Pleaſure, has alſo an egg-ſhaped pouch, with a permanent ſhaft. The pouch in Creſſet is of a globular form. The Shepherd's-Purſe * is a familiar example of the ſecond ſubdiviſion. You need not go far out of your way in ſearch of it, for it grows almoſt every where; the proper ſeaſon for its flowering is in the months of March and April, but its bloſſoms are ſeen nearly the year round. The ſoil, from whence it derives its nouriſhment, has great influence, both upon its height and the ſhape of the leaves; in ſome places it is no more than three inches high, in others it reaches to as many feet. It has obtained its name from the ſhape of its pods, which are like an inverted heart, deeply notched at top, and obviouſly diſtinguiſhing it from the others among which it ranks.

The ſecond order is alſo ſeparated into two ſections; in the firſt, the leaves of the cup approach each other towards the top, cloſing the cup; in the ſecond, they diverge or ſpread wide open. Wormſeed †, Turkey-pod ‡, Wall-flower §, and Cabbage ¶, are among the former. The pod in Wormſeed is long and narrow, with

* Thlaſpi † Eryſimum. ‡ Arabis. § Cheiranthus. ¶ Braſſica.

with four edges; the common ſort is known by the pods growing cloſe to the ſpike. Winter-Creſſes, another ſpecies, has lyre-ſhaped leaves, with a circular ſegment at the end; and a third ſort, called Jack by the Hedge, or Sauce-alone, from its ſmell reſembling Garlick, has leaves of an heart ſhape and white bloſſoms. Turkey-pod is furniſhed with four honey-cups, each compoſed of a ſmall reflex ſcale, fixed to the bottom of the receptacle, within the leaflets of the calyx. The Mouſe-ear, one of the ſpecies, has white bloſſoms, and the leaves ſitting cloſe to the ſtem. Cultivation has produced many beautiful varieties of the Wallflower, both double and ſingle, differing in colour from the pale yellow to the deep orange; but none of them excelling the wild kind in fragrance. The baſe of each of the ſhort ſtamens is ſurrounded by a honey-cup gland, that cauſes the hunched appearance of the cup, which you may have remarked. Both Cabbage and Turnip have four honey-cups, one placed between each ſhort ſtamen and the pointal, and one between each pair of the longer ſtamens and the cup; the leaflets which form the calyx are erect, and the claws of the petals nearly as long as the cup; the pod is ſhaped like a cylinder flattened at the ſides, having valves not ſo long as the partition, and containing ſeveral globular ſeeds: thus far they agree,

agree; but the root of the Turnip differs materially from that of the Cabbage; it is a continuation of the ſtem, forming that round, compreſſed, fleſhy ſubſtance which we eat, and which affords wholeſome nouriſhment to cattle as well as man. In the ſecond ſection we ſhall find Sea-Colewort *. Woad †, Muſtard ‡, and Water-Creſs §. The eſſential character of the firſt depends upon the four longer filaments being forked, and the anthers fixed on the outer forks. Woad has a ſpear-ſhaped oblong pod, with one cell and two valves, which are boat-ſhaped; in the centre of the ſeed-veſſel is one ſeed only. That ſpecies, which has the root leaves ſcolloped, and thoſe on the ſtem arrow-ſhaped, with yellow bloſſoms, was uſed formerly by the ancient Britons to ſtain their bodies, in order to render them more formidable to their enemies, by their terrific appearance; it has ſince been found of extenſive utility in the art of dyeing, forming the baſis of many colours, particularly blue. Muſtard differs from Cabbage, although nearly allied to it, in having an expanding cup and the claws of the petals upright. In both, the honey-cup glands are placed in a ſimilar manner. The pod is rough, and the partition uſually much longer than the valves. One ſpecies, abounding in corn fields, has a ſmooth pod, with many angles,

* Crambe. † Iſatis. ‡ Sinapis. § Siſymbrium.

angles, bunched out by the ſeeds. The leaves are harſh and deeply indented, the bloſſom it bears is yellow, which produces brown ſeeds. The common ſort, with whoſe ſeeds, reduced to powder, we uſe to ſeaſon our food, has alſo a ſmooth pod, the lower leaves are large and harſh, but the upper ones ſmooth and without indentures, not only the bloſſom is yellow, but the cup alſo. The Water-Creſs, ſo well known for the wholeſome and pleaſant ſallad it affords, is moſtly found in running waters, ſuch as brooks and rivulets. The corolla, as well as the calyx, is expanding in this numerous genus, and the valves of the ſeed-veſſel are ſtraight and ſhorter than the partition. The characters that diſtinguiſh the common ſpecies, are pods declining, and wing-ſhaped leaves with white bloſſoms, which grow in a corymb. Having given you a ſufficient number of examples in this caſe, to ſpur your induſtry to ſearch for more, I ſhall bring my letter to a concluſion, and take the advantage of a fine afternoon to enjoy a diſh of tea with my mother in the ſummerhouſe. How I wiſh you could be of the party! that addition would complete the pleaſure of your truly affectionate ſiſter,

FELICIA.

LETTER

LETTER XXI.

DEAR SISTER, *Shrubbery, July 9.*

AS the ſeaſon is ſtealing on us apace, I am impatient of delay, being deſirous of conducting you through all the twenty-four claſſes of Linnæus before you return; next ſummer I promiſe myſelf the pleaſure of recapitulating our firſt principles, and applying them to new objects together, which will give us an opportunity of trying our ſtrength, and confirming what little knowledge we may have acquired. We are now arrived at the ſixteenth claſs, which differs, in many reſpects, from any that we have hitherto conſidered. In all the preceding ones you may have obſerved, that the ſtamens whether few or many, have been evidently diſtinct from each other; but in the preſent inſtance, you will always find them united at bottom, into one brotherhood, as it is called, and that is the meaning of the Greek name Monodelphia; but ſtill they are perfectly ſeparate at top, which is a diſtinction that characteriſes this claſs from ſome ſucceeding ones. The number of ſtamens being unneceſſary to determine the claſs, is uſed for a different purpoſe, and the orders are arranged according

according to the number of them in each flower. The features by which this natural tribe is recognifed, are a cup that is permanent, and, in many inftances, double; a corolla compofed of five petals, fhaped like a heart reverfed, the edge of one lying over that of the next, in an oppofite direction to the apparent motion of the fun; the anthers fixed fideways to the filaments, which are of unequal lengths, the outer ones being the fhorteft; the receptacle rifes in the midft of the flower like a column, the top of it encircled by the upright feed-buds, in the form of a jointed ring; all the pointals are united at their bafe into one body with the receptacle, though divided at top into as many parts as there are feed-buds; thefe feed-buds become capfules, the number of the cells are regulated by the number of the pointals, the figure varies in different genera, and they frequently confift of as many feed-coats or arils, each concealing a kidney-fhaped feed. Decandria, fo denominated from having ten ftamens, is the firft order of which I fhall treat; it comprehends but one genus of thofe plants that grow wild in Great Britain, but that is a very numerous one, and is known by the name of Cranefbill *; the beautiful family of Geraniums, of which one greenhoufe difplays fuch an amazing variety, is of the fame genus; but

* Geranium.

but as moſt of theſe came originally from the Cape of Good Hope, I ſhall leave them to your own examination, and proceed to ſelect a few native ſpecimens. The circumſtances common to the different ſpecies, are a ſingle cup of five leaves, the petals of the corolla correſponding with them in number; the ten ſtamens alternately longer and ſhorter, but all of them ſhorter than the bloſſom; one pointal terminated by five ſtigmas, longer than the ſtamens, and permanent as well as the cup; the fruit compoſed of five dry berries furniſhed with a bill, each containing a ſingle ſeed, crowned with a tail or awn, which rolls up in a ſpiral form when the ſeed becomes ripe; and thus they are detached from the flower, and ſcattered about, in order to preſerve the ſpecies. Every other ſtamen, only, is furniſhed with a tip in ſome ſpecies. The awn of the ſeed is ſometimes hairy, and in other inſtances ſmooth. The Hemlock-leaved Craneſbill, as well as the muſked, has but five ſtamens, in both the leaves are winged and jagged at the edges, and ſeveral flowers grow on the ſame foot-ſtalk, but the latter is known by a ſtrong ſmell of muſk, which it loſes upon being bruiſed. In the next ſection are found ten ſtamens, all tipped with anthers, and the fruit-ſtalk ſupporting two flowers. The ſpotted Craneſbill has downy leaves, with five lobes or ſcollops, and

theſe again divided into ſmaller indentures; the bloſſoms are of a deep purple. In the Meadow Craneſbill they are of a fine blue, the petals are entire, and the leaves are wrinkled and divided deeply into many parts. In woods, and eſpecially under the hedges which ſurround woods, is frequently found the herb Robert, which loves a ſhady, ſheltered ſituation, the ſtalks are as red as blood, and towards the end of the year, both ſtalks and leaves become of the ſame colour. It is diſtinguiſhed from others of the ſame genus, by its hairy pointed cups, with ten angles; the bloſſoms are of a pale roſe-colour, though ſometimes a variety occurs with white ones. Many ſtamens in one flower characteriſe the ſixth order. Lavatera, or Velvet-leaf, has a double cup, one leaf, with three ſhallow clefts, forms the outer one, the inner one is alſo of one leaf, but divided into five clefts, the ſeed-coats compoſe a ring round the receptacle, which ſtands like a pillar in the centre of the bloſſom; the ſpecies, found here, has a woody ſtem and downy plaited leaves, with ſeven angles, it grows on the ſea-ſhore. The ſtem of the Dwarf Mallow is proſtrate, the leaves circular and ſlightly indented, the fruit-ſtalks declining. Before the art of gardening had attained the perfection of modern times, the leaves of this plant were brought to table, as thoſe of the cabbage are at preſent.

The common kind, which abounds in hedges, foot-paths, and among rubbiſh, has an upright ſtem, the leaves have ſeven ſharp diviſions, both foot ſtalks and leaf-ſtalks are hairy. It is often cultivated, and many varieties produced. The Marſhmallow * is marked by its ſimple downy leaves, as ſoft as velvet, the bloſſom reſembles that of the Mallow. It is valued for its medicinal, healing qualities, being generally uſeful as an external application, in thoſe caſes where cooling, ſoftening remedies are neceſſary. Before you diſmiſs the Mallow tribe, take your microſcope, and examine the duſt of the anthers; it will afford you entertainment, being curiouſly toothed like the wheels of a watch. The moſt minute parts of nature are finiſhed with an elegant nicety, that ſurpaſſes the utmoſt efforts of art. The finger of the Divine Artiſt is viſible in the moſt minute of his works; let us be excited to obſerve them with the greateſt attention, they will not only ſupply us with preſent amuſement and wonder, but will ſerve as a hidden treaſure to alleviate the ſolitude and wearifomeneſs of old age. May a ſimilarity of taſte and ſentiment continue to unite us in the ſame purſuits, to the end of our days.

FELICIA.

LETTER

* Althæa.

LETTER XXII.

DEAR CONSTANCE, *Shrubbery, July* 14.

THE leguminous plants, or Butterfly-ſhaped flowers, are comprehended in the ſeventeenth claſs, Diadelphia. The diſpoſition of the ſtamens diſtinguiſhes the claſs, and the number of them the orders. In the firſt order there are five, in the ſecond ſix, in the third eight, and in the fourth ten. The ſignification of the Greek name, is two brotherhoods; and you might expect, from that circumſtance to find them always divided into two ſets; but this is not invariably the caſe, for, in many inſtances, they are united in one ſet only. The natural character you have already ſtudied pretty attentively, under the deſcription of the Pea-flower, which will ſerve to give a general idea of all the reſt. The three firſt orders will furniſh me with only two genera for your inſpection. Fumitory* has but two filaments, each of them crowned by two anthers, which is ſufficient to place it in the ſecond order. It has a cup of two leaves, and the bloſſom partakes more of the form of the ringent than the papilionaceous flowers; the upper lip, however,

 correſponds

* Fumaria,

correſponds to the banner, the lower one to the keel, and the cloven mouth to the wings. Common Fumitory bears the ſeed-veſſels in bunches, each containing a ſingle ſeed: the leaves are doubly winged, with three diviſions, and theſe again ſubdivided. The bloſſoms are produced in long ſpikes, at the end of the ſtalks, and are of a pink and deep purple. There is but one ſpecies of Milkwort*, though the genus is numerous, which grows without culture, and that is found on heaths and poor meadow ground. It is ranked in the third order, Octandria, on account of its eight filaments, each being tipped with anthers, which are united at the bottom. The wings may be ſaid to belong to the cup, as they are formed of two coloured leaves which proceed from it. The banner is generally cylindrical; towards the end of the keel, which is hollow, are fixed two appendages, pencil-ſhaped, with three diviſions; many ſpecies are without this diſtinction, which throws the genus naturally into two ſections. The flowers of the wild ſort are furniſhed with this creſt, they grow in bunches on herbaceous ſtems, which are trailing; the leaves are narrow, and the mixture of blue, white, and fleſh-coloured bloſſoms has a pretty effect. The plants of the laſt order are numerous, and bear ſuch an affinity, in their general appearance, that it is not difficult

* Polygala.

difficult to recogniſe them at firſt ſight. The papilionaceous bloſſom, the leaves moſtly in pairs, like wings, up the leaf-ſtalks, ſometimes terminated by a ſingle one; ſtalks ſlender and creeping, unable to ſupport themſelves, and twiſting round every thing near them. Frequently furniſhed with tendrils or claſps, for the purpoſe of holding by the firſt prop they can reach, are features that denote them to belong to the ſame family. But this air or character muſt always be confirmed by the union of the ten filaments at the bottom, which puts the matter beyond doubt; remembering what I have already obſerved, that, although the eſſential mark of the claſs is the ſeparation of the ſtamens into two ſets, nine of them incloſed together by a membrane ſurrounding the germ, and the tenth placed by itſelf above the pointal, yet in many ſpecies they grow all ten together, which muſt not deter you from arranging them amongſt their proper companions. Several trees and ſhrubs are found with Butterfly-ſhaped bloſſoms, and poſſeſſing the requiſites of the claſs, are ranked in it. Among the ſhrubs are the Broom * and the Geniſta, adorning the hedges of dry paſtures by their ſhowy yellow flowers, the ten ſtamens are connected in both, the leaves of the former grow in threes, and the

* Spartium.

branches are without prickles, in the latter, the leaves are gloſſy, narrow, and upright, and the branches ſtreaked. You can ſcarcely paſs over a heath or common that is not covered with Gorze*, or Furze, which differs from the Broom or Geniſta, in having a cup with two leaves, and the legume ſo ſhort, as to be almoſt covered by it. This is an extremely hardy ſhrub, and, on that account is ſuitable for fences in the bleakeſt ſituations; not even the ſea-ſpray deſtroys it, which kills almoſt every other. A calyx, with five diviſions, nearly as long as the bloſſom, and the ten filaments united in one entire cylinder, diſtinguiſh the Reſtharrows †, which are lowly ſhrubs, growing alſo in heaths and barren places. The Dutch ſow them on the banks of their dykes, as their ſtrong matted roots tend to fortify them againſt the incurſions of the water. The Wood Pea ‡ has a calyx of one leaf, the ſtandard of the corolla reflected back, the wings approaching and riſing upwards; nine of the filaments are united beneath the pointal, but the tenth is placed above it, and aſcends upwards. It is an elegant plant, the ſtem ſimple below, but branched towards the top, bearing three or four purple branches on a branch, which become blue as they go off, and are ſucceeded by a legume, which likewiſe changes

* Ulex. † Ononis. ‡ Orobus.

changes from red to black: the ſeparation of the branches are cloathed with half arrow-ſhaped props, often jagged at the bottom. The Highlanders dry the roots, and chew them like tobacco, to repel hunger and thirſt. The chief diſtinction between the Pea * and the Vetchling † conſiſts in the ſtaft; in the Pea it is triangular, keel-ſhaped, and woolly; whilſt that of the Vetchling is flat and upright, with a woolly ſummit. Some ſpecies produce only one flower on a foot-ſtalk, among which are the Yellow Vetchling and Crimſon Graſs Vetch, the former having tendrils without leaves, and props ſhaped like the head of an arrow; the latter has ſimple leaves, and awl-ſhaped props. Some others bear ſeveral flowers on the fruit-ſtalk, as the Rough-codded Chickling Vetch, which has ſpear-ſhaped leaves, with hairy ſhells and rough ſeeds. The bloſſoms are crimſon, ſtreaked with yellow lines withinſide. In the ſame diviſion are the broad and narrow-leafed Peaſe everlaſting: they agree in having tendrils furniſhed with two leaves, which in the one do not exceed the breadth of the ſtem; but in the other are much broader. The Vetch‡, or Tare, is marked by having the ſtigma of the pointal bearded on the under ſide, the filaments are divided into two ſets, and the genus into two ſections, the firſt bearing the flowers on

 peduncles,

* Piſum. † Lathyrus. ‡ Vicia.

peduncles, the second producing them at the base of the leaves, sitting almost close to the stem. Of the former section are two species, one with little oval leaves and white blossoms, the other with spear-shaped downy leaves and purple blossoms. Among those of the second section, one generally produces two legumes growing together, another four, and in a third sort they grow single. There are many species of the Trefoils*, their flowers forming a little rundle or head upon a common receptacle; the wings of the corolla are shorter than the standards, which is reflected, and the keels still shorter than the wings. The subterranean Trefoil takes its name from its shells being frequently produced under the surface of the earth, the heads are woolly, containing five flowers, with a bushy substance in the middle, involving the seed-vessel. It was not known to be a native of this country till very lately. In the autumn of 1795 it was found at Norwich and Languard Fort. Saintfoin † is cultivated like clover for feeding cattle. It loves a dry chalky soil; the leaves are winged, and the shells covered with prickles, each shell containing a single seed. The essential character of the Horseshoe‡ consists in the form of the shell, whence it takes its name. The shape of the legume particularises the

* Trifolium. † Hedysarum. ‡ Hippocrepis.

the different ſpecies of Snail-ſhell*, in ſome it is rolled up ſpirally, like the ſhell of a ſnail, or a green caterpillar; in others it is of a ſemicircular form, reſembling a bow or a creſcent. Shall I intrude, my dear Conſtance, by introducing the next claſs before I cloſe my letter? as it contains but one genus natural to this country, I am unwilling to appropriate a letter to it only, truſting to your uſual patience to forgive me, if I weary you. The circumſtance of the ſtamens being united by the threads into three or more ſets, gives the name of Polyadelphia to the eighteenth claſs. The only genus I ſhall mention is the Tutſan†, which has a cup with five diviſions, incloſing the ſeed-bud, and a bloſſom of five petals, bending from the left to the right, its numerous hair-like threads connected at bottom, into three or five ſets, like a hair pencil with ſmall tips; the ſhafts vary in number from one or two, to five; the ſeed-veſſel is a capſule, with as many ſhells as there are ſhafts. Park-leaves, or Tutſan St. John's Wort, has three pointals, its bloſſoms are yellow, which are ſucceeded by a berry, the ſtem is ſhrubby and two edged. Common St. John's Wort has the ſame number of pointals, and a ſtem reſembling that of the laſt-mentioned kind, but it differs from it in its leaves, which are blunt and ſprinkled with tran-

* Medicago. † Hypericum.

ſparent ſpots, that are ſometimes red; another ſpecies has proſtrate, trailing ſtems, the flowers growing ſingly at the baſe of the leaves. Among hedges, and on rough grounds, is found the hairy St. John's Wort, with upright cylindrical ſtems, and downy egg-ſhaped leaves. Adieu! I perceive the approaches of autumn with pleaſure, conſidering them as forerunners of the period, which is fixed for your return to your affectionate

FELICIA.

LETTER XXIII.

Shrubbery, Auguſt 5.

RECAL to your mind, my dear Conſtance, what I formerly told you of the compound flowers, deſcribed in the ſyſtem of Linnæus, in the general account of the nineteenth claſs, Syngeneſia. Before I proceed to point out the peculiarities of the different genera, it is neceſſary to acquire pretty accurate ideas of the ſtructure of the parts which compoſe the different kinds of

of compound flowers, as well as the diſtinctions of the orders into which the claſs is divided. The eſſential character of a compound flower does not conſiſt in the compoſition of many florets, but in the union of the tips at top, into the form of a cylinder, and a ſingle ſeed being placed upon the receptacle under each floret. Though the flowers of this claſs generally are compoſed of many florets ſitting upon a common receptacle, incloſed by one common empalement. Sometimes this calyx conſiſts of a ſingle row of ſcales or leaves, divided to the baſe, for the convenience of cloſing or opening without tearing; in other genera, the ſcales are numerous, lying one above another in rows, like the tiles upon the roof of a houſe, whilſt the cups of ſome are formed of a row of equal ſegments next to the florets, and another row of ſhort ſcales grow at the baſe of the longer ones, and turn back towards the foot-ſtalk. The ſurface of the receptacle is of different forms, concave, flat, convex, pyramidal, or globular, and is either ſmooth, full of little holes, or beſet with ſoft hairs, or ſmall upright ſcales, which ſeparate the florets placed upon it. A floret conſiſts of one petal, moſtly regular, and the other divided into three clefts; the five filaments of the ſtamens are fixed to the tube of this corolla, and unite at top, ſo as to form a cylindrical tube, through

which

which paſſes the ſhaft of the pointal, the ſummit moſtly riſing above the floret, and terminating in two curling forks. The ſtoret and pointal both reſt upon the ſeed-bud, which lengthens as the ſeed becomes mature; if it be a naked ſeed, it falls to the ground, when ripe; but if winged, or tipped with feathers, it wafts its way through the air to a diſtance, and there produces a new plant the following ſeaſon. This downy ſubſtance, or crown of feathers, is either ſitting cloſe to the ſeed, or fixed on the top of a pedicle, like a ſmall pillar. The natural tribe, under conſideration, will furniſh you with much ſubject of admiration, and bring new proofs to your reflecting mind, that thoſe parts of organiſed nature, which appear, to a caſual obſerver, as trivial and inſignificant, are contrived with the moſt perfect wiſdom and intelligence, and with deſign to anſwer particular purpoſes. Who can obſerve without wonder, the elaſticity of the calyx in many genera of this claſs? The expanſion of the florets appears to burſt it open, but when they wither, it riſes up and cloſes, by which means the tender ſeed is protected, till it is fit for diſperſion; the hairs that crown the ſeeds, before upright, diverge, and force the leaves of the calyx open again, which now bend quite back, and leave a paſſage for the ſeeds to eſcape. For the diſtinction of the orders, I muſt refer

refer you to my eighth letter. The order Polygamia Æqualis is ſubdivided into three ſections. In the firſt, all the florets are narrow, or correſponding with the Semifloſculous flowers of Tournefort; in the next the flowers grow in globular heads; and the third is compoſed of thoſe which have tubular florets only. Endive* has a double cup, the receptacle a little chaffy, and the feather five toothed. The bloſſoms of the wild Succory or Endive are blue, and grow in pairs ſitting on the ſtem; the leaves are notched. Goatſbeard †, Oxtongue ‡, and Dandelion §, agree in having a naked receptacle and a downy feather; but the cup in Goatſbeard is ſimple, compoſed of eight ſpear-ſhaped leaves; thoſe of the plant are entire, ſtiff, and ſtraight. This is one of Flora's time-keepers: the bloſſom expands early in the morning, and cloſes again before noon. Oxtongue has a double cup and a yellow bloſſom. The empalement in the Dandelion is tiled, the leaves are deeply jagged, the round white head formed by the expanſion of the downy feathers you are too well acquainted with, to need a deſcription, as they have ſo often amuſed our infant hours with blowing them off the receptacle. The ſecond ſection preſents us with the Thiſtle ‖ tribe, diſregarded

on

* Cichorium. † Tragopogon. ‡ Picris. § Leontodon.
‖ Carduus.

on account of their uncouth, harſh appearance, and their abundance, but neither deſtitute of beauty, on further inſpection, or void of utility; for nothing would grow for years on clay newly thrown up, were it not that the ſeeds of thiſtles fix and vegetate there, and, as they grow up, ſhelter other plants, which arrive at maturity under their protection. Many of the ſpecies have lately been introduced into gardens, and become beautiful by cultivation. An empalement, beſet with thorny ſcales, and a receptacle with hairs between the ſeeds characteriſe this intractable race. The leaves of many of the ſpecies run along the ſtem, their thorny edges forbid a very cloſe approach. The Milk Thiſtle has the leaves prettily marbled with white, they are halberd-ſhaped, with thorny winged clefts. The banks of rivers and brooks will afford you the Liverhemp*, as a ſpecimen of the third ſection; a large plant with fingered leaves, the ſtalks are tall and rough, and bear bunches of pale red bloſſoms each cup containing about five florets. The genus is known by a tiled oblong cup, a naked receptacle, a downy feather, and a very long pointal, cloven down to the ſtamens. The ſecond order, Polygamia Superflua, is divided into two ſections; the firſt containing thoſe that have all the florets tubular; the ſecond, thoſe that are radiate,

* Eupatorium.

radiate, and in which the florets of the circumference are narrow or ſtrap-ſhaped. The genus Artemiſia includes Southernwood, the Wormwoods, and Mugwort, each of which poſſeſs the quality of an aromatic bitter. They are known by a roundiſh empalement, compoſed of many circular ſcales, naked ſeeds, and a flat receptacle, which is either woolly or bare; the flowers are entirely without a ray, and conſequently exemplify thoſe called diſcoid. Wild Southernwood has leaves with many clefts, and long tender ſhoots proceeding from its trailing ſtems. The Common Wormwood is diſtinguiſhed from it by upright herbaceous ſtems; the flowers are rather globular and pendant, the leaves are compound, with many diviſions; the bloſſoms of both are browniſh, a colour unuſual among flowers. Nature appears to delight in diſplaying the gayeſt hues in the vegetable part of the creation. Tanſey *, with the juice of which puddings are frequently flavoured, has an empalement, ſhaped like a globe, divided in half, tiled with ſharp ſcales; the flowers of the ray have only three clefts, but thoſe of the diſk five; both the ſeeds and the receptacle are naked. The common Tanſey bears yellow bloſſoms, the leaves are doubly winged, and jagged at the edges. The fleſh-fly has ſuch a diſlike to the

ſmell

* Tanacetum.

ſmell of this plant, that any animal ſubſtance, ſuch as meat, &c. that is rubbed with it, is perfectly ſecure from the attacks of this inſect. The Daiſy *, which enamels every meadow with its vernal and autumnal flowers, belongs to the ſecond diviſion; the cup is formed of a double row of ſmall ſpear-ſhaped leaves; the numerous tubular florets in the diſk are furniſhed with both ſtamens and pointals, whilſt thoſe which compoſe the ray are ſtrap-ſhaped, and contain pointals only: the ſeeds are without a feather, and the receptacle naked and conical. Apply your microſcope, and you will be pleaſed with the beauty and variety diſcernible in this little diſregarded flower. The florets of the centre are yellow, thoſe of the ray white above and pink beneath; the leaves of the common ſort are oblong and blunt, and ſpread flat upon the ground, a naked ſtalk ſupports a ſingle flower. Both Chamomile † and Yarrow ‡ have chaffy receptacles, but the calyx of the firſt is hemiſpherical, or of the ſhape of a globe divided in half, whilſt that of the latter is oblong or egg-ſhaped, and tiled with ſharp ſcales. Chamomile has more than five ſemiflorets in the ray, and the ſeeds are without down. The ſpecies that is uſed medicinally, as well as ſeveral other ſpecies, has yellow florets in the centre, ſurrounded by white ones

* Bellis. † Anthemis. ‡ Achillea.

ones in the circumference, the leaves are winged and compound, with ſharp narrow diviſions, the whole a little hairy; cultivation renders it double, by increaſing the number of florets in the circumference, and diminiſhing thoſe of the centre. The leaves of the common Yarrow are doubly winged and without hairs, the ſtem is furrowed towards the top, it bears a white bloſſom, ſometimes tinged with red or purple. Were I to enumerate all the genera of this numerous order, I ſhould extend my letter to an unreaſonable length, therefore you muſt be contented with thoſe already noticed, and ſuffer me to proceed to the third order, from which I ſhall ſelect only the Knapweed *. In this genus the ſcales of the cup and the feathers of the ſeed vary in different ſpecies; the corollas of the ray are tubular, longer than thoſe of the diſk, and irregular in their form; the receptacle is furniſhed with briſtles between the florets. There are many varieties of the Blue-bottle or Cornflower, if we enumerate them by the colour of the bloſſom, which is ſometimes white, red, purple, violet, or variegated with different hues; but, in all, the ſcales of the cup are fringed, the upper leaves are narrow and entire, but thoſe towards the ground are broader, and toothed at the edges. Great Knapweed has leaves with winged

* Centaurea.

ed clefts, and bears its bloſſoms on long naked fruit-ſtalks; another ſpecies called Horſe-knops, has ſkinny, ragged cups, with ſpear-ſhaped leaves and angular branches: there are two other ſpecies with cups doubly ſpined, one of them called Star-thiſtle, has ſtrap-ſhaped toothed leaves with winged clefts and a hairy ſtem. St. Barnaby's Thiſtle is known by its ſpear-ſhaped leaves running along the branches, thoſe neareſt the root are lyre-ſhaped and winged. The generic character of Cudweed *, the only ſpecimen I ſhall mention of the fourth order are, a naked receptacle, ſeeds without down, and florets with pointals fixed amongſt the ſcales of the calyx. Barren paſtures and ſandy corn fields produce the different ſpecies, which are chiefly diſtinguiſhed by the form of the flowers: in one kind they are round, in a ſecond conical, and in a third awl-ſhaped. The ſixth and laſt order differs widely from the natural family of compound flowers, contained in thoſe of the preceding orders, except in the union of the five anthers, the appropriate badge of the claſs. The flowers are ſimple; that is to ſay, one flower is incloſed in one calyx, like thoſe of the other claſſes. The whole genus of Violets † is furniſhed with a cup of five leaves, an irregular corolla of five petals, the uppermoſt petal terminating at the baſe in a horn

* Filago. † Viola.

horn or ſpur, performing the office of a nectary or honey-cup, and a capſule of one cell and three valves, above the receptacle, or incloſed by the calyx. The Sweet Violet, ſo much valued and admired for its odoriferous fragrance, perfuming the banks and hedges in ſpring, is among thoſe which have no ſtalk, but that which ſupports the flower, and the ſuckers which creep from it; the leaves are heart-ſhaped, and the bloſſoms darkiſh purple; there is a variety with white flowers: the colour, as well as the number of the petals, is varied by cultivation, conſequently this vernal favourite is ſeen in gardens under many appearances. At the firſt opening of the Dog Violet, it has no ſtalk; but, as it attains its full growth, the ſtalk ſhoots up and produces both fruit-ſtalks and leaves, which ſufficiently diſtinguiſhes it from the Sweet Violet, whoſe leaves grow only from the root. Hearts Eaſe or Panſies, have props with winged cleſts and a globular, open, hollow ſtigma, fringed towards the bottom; the ſtems are ſpreading and three-cornered, with oblong gaſhed leaves: it obtains its name of Tricolor, from the union of purple, yellow, and light blue, which enriches its ſhowy bloſſoms; the particles of the duſt, when magnified, appear angular, but become round when wetted with water. This is not an uncommon effect of moiſture on the duſt of plants.

plants. You are well acquainted with the foreign Balſams *, raiſed by the gardener in pots, to adorn the court yard. The genus is characteriſed by a calyx of two leaves, a five petalled corolla, the bottom of which is received into the honey-cup of the leaf, ſhaped like a hood, and a capſule of five valves. There is one wild ſpecies found chiefly in the northern countries, which has egg-ſhaped leaves, and fruit-ſtalks ſupporting ſeveral yellow bloſſoms, the ſtem ſwelling at the joints; the vulgar name, Touch Me Not, is expreſſive of the claſticity of the capſule, which, when the ſeeds are ripe, ſuddenly burſts open with conſiderable force, upon the ſlighteſt impulſe.

Rejoice with me, that I have at laſt reached the concluſion of this very long letter, and believe, that I ſhall ever remain, with undiminiſhed affection, your

FELICIA.

* Impatiens.

LETTER

LETTER XXIV.

DEAR CONSTANCE, *Shrubbery, August 10.*

THE twentieth class, Gynandria, is distinguished from all others, by the circumstance of having the stamens fixed upon the shaft of the pointal itself, or upon a receptacle lengthened out into the form of a shaft; whereas, we have hitherto observed, that these parts have been perfectly separate and independent of each other. The orders are marked by the number of stamens in each flower. The first, called Diandria, from having always two stamens, contains a natural tribe so nearly allied, that the form of the nectary alone affords a distinction to the several genera. The structure of these flowers is very singular, as well as that of the root; each claims your particular attention. In some species the root is composed of a pair of solid bulbs; in others it consists of a set of oblong, fleshy substances, tapering towards the ends, like the fingers of the hand. The unusual situation of the parts of fructification in the plants of this family gives the blossoms a very particular appearance, and renders an accurate description of them necessary. The oblong seed-bud is always placed below

below the flower, twiſted like a ſcrew, a ſpathe or ſheath ſupplies the want of a proper calyx; the corolla has five petals irregularly ſhaped, the two innermoſt uniting over the others in the form of an arch; the nectary forms the lower lip, and ſtands in the place of the pointal and a ſixth petal; to the inner edge of the nectary adheres the ſhaft, which, with its ſtigma, is ſcarcely diſtinguiſhable: the ſtamens are very ſhort, and are alſo fixed to the inner rim of the honey-cup; the tips have no covering, their texture reſembles the pulp of oranges; two ſmall cells, opening downwards, incloſe them, and almoſt conceal them from obſervation. The ſpiral germ is converted into a capſule of three valves, opening at the angles under the keel-ſhaped ribs; within is one cell, containing many ſeeds like ſaw-duſt, growing upon a narrow receptacle upon each valve. The moſt numerous genus of this order is the Orchis, known from the reſt by its horn-ſhaped honey-cup; the form of the roots throws it into three diviſions; among thoſe with double bulbs is the Buttterfly Orchis, perhaps ſo called from its expanding petals; the horn is very long, and the lip ſpear-ſhaped; its greeniſh white bloſſoms emit an agreeable ſcent, eſpecially in the evening. The Purple, late-flowering Orchis, is found in dry paſtures, the lip has two horns, cloven into three cleſts, equal and entire;

it

it grows about a foot high, with five or ſix ſpear-ſhaped leaves proceeding from the root. There are two kinds very common, called Male and Female Orchis, but without any reaſon for that diſtinction; the Male differs from the Female by the outer petals being longer and ſharper, and the middle lobe of the cup cloven, and longer than thoſe of the ſides; it produces more flowers, and the ſtem is twice as tall. The bloſſoms of the Female are white, or red mottled with white, or violet-coloured; thoſe of the Male are of a deep purple. The broad-leafed and the ſpotted Orchis grow moſtly in moiſt meadows, the roots of both are palmated or hand ſhaped, though that of the ſpotted is more expanding; the firſt has a hollow ſtem, and leaves a little ſpotted, but the ſtem of the latter is ſolid, and the leaves covered with black ſpots: the broad-leafed has a conical honey-cup, and the lip divided into three lobes, the ſide ones reflecting back; the horn in the other ſpecies is ſhorter than the germ, and the lip is flat. The general characters already given of the order will ſuit the next genus, Satyrion*, except particularifing the ſhape of the nectary, which terminates in a bag like a double purſe. The root of the Lizard flower conſiſts of two undivided bulbs; the leaves are ſpear-ſhaped, and the lip of the corolla

* Satirium.

corolla cut into three ſegments, the middle one extremely long, and looks as if it had been bitten off at the end; the bloſſoms are white, inclined to a greeniſh hue on the outſide, but within of a duſky purple; by age the whole corolla changes to a dingy red: this plant ſometimes attains the height of three feet. The Twayblades* form another genus, of which the honey-cup is longer than the petals; it hangs down, and is keeled on the back part. It is this keel that, in ſome ſpecies, bears ſo cloſe a reſemblance to particular inſects, as almoſt to deceive the eye at a diſtance. Common Twayblade has a fibrous root, and a ſtem with only two leaves, which are egg-ſhaped. The lip is biſected. The ſtem of Triple Ladies Traces is ſomewhat leafy, the flowers grow ſpirally, and all point one way; the lip is not divided, but only notched with a ſmall ſcollop, the three outer petals are glued together; it flouriſhes in barren paſtures, and ſeldom riſes to a greater height than five or ſix inches. The curious kinds of Fly and Bee Orchiſes, concur in double roundiſh bulbs and a ſtem furniſhed with leaves. The Fly Orchis has the lip of the honey-cup cloven into four clefts, the wings and helmet are greeniſh. The lip of the Bee is divided into five lobes, bent downwards; the outermoſt petals are large

* Ophrys.

large and ſpreading, of a purple colour, the two innermoſt green, the lower lip of the honey-cup is cut into three ſegments, and is ſhorter than the petals; the colour is browniſh purple, mixed with yellow, the upper lip is the longeſt, narrowing to a point, and is green; the filaments are long, and the anthers very large; the ſeed-bud exceeds the petals in length, but does not equal that of the floral leaves. Search for theſe admirable deceptions among the graſs in chalky ſoils; their beauty will amply repay your trouble. Lady's Slipper*, ſo named from the ſhape of the nectary, which is fancied to reſemble the form of a ſlipper, has fibrous roots, the ſtem riſes about a foot high, and is leafy; the leaves are between egg and ſpear-ſhape, the purple petals are ſet off to advantage by the pale yellow honey-cups. The Cuckow Pint†, which we have frequently gathered under the vulgar name of Lords and Ladies, is found in hedges, where, in ſpring, it makes its firſt appearance by a very large oblong leaf, in the centre of which is a club-ſhaped fruit-ſtalk or receptacle, naked on the upper part, but covered with ſeed-buds at bottom, and with anthers in the middle, ſo that the filaments are unneceſſary: as the plant approaches to maturity, the ſheath opens and unveils the club, which varies gradually, from a

* Cypripedium. † Arum.

yellowiſh green, to a fine red purple; when this withers, it is ſucceeded by a head of round, red berries, which are acrid and poignant, as is the whole plant. This extraordinary genus has perplexed botaniſts where to place it.

The unuſual figure, as well as beauty, of many of the plants deſcribed in this letter, will ſurely ſerve you for entertainment, till I have leiſure to write again: in the interim, be aſſured of my entire affection.

FELICIA.

LETTER XXV.

DEAR CONSTANCE, *Shrubbery, Auguſt* 13.

THE twenty-firſt claſs, Monœcia, which now falls under conſideration, differs, in a very eſſential particular, from any yet obſerved: we are no longer to look for perfect flowers within the ſame empalement, but may expect to find the bloſſoms of an individual plant varying in character, ſome bearing ſtamens only, and others pointals alone. The former are barren, yielding

no

no ſeed, but the piſtilliferous flowers produce a germ, furniſhed with ſeeds. Ditches, ponds, and ſtagnant waters nouriſh moſt of the Stone-worts*; the fertile bloſſoms have a cup of four awl-ſhaped leaves, the two outer ones longeſt and oppoſite, the corolla is wanting, the ſeed-bud ſhaped like a turban, and produces one ſolitary, egg-ſhaped ſeed; the barren flowers grow at the baſe of the ſeed-bud, on the outſide of the empalement. There are ſeveral ſpecies, but as you cannot gather them without wetting your feet, it will be needleſs to ſpecify their minute diſtinctions. The very numerous tribe of Sedges†, having three ſtamens, belongs to the third order, and generally grows in bogs and marſhy places: both kinds of flowers are borne on catkins, conſiſting of ſcales, each containing a ſingle flower, neither kind has any corolla; the fertile flowers have a three-toothed nectary, which is puffed up, and within which is the triangular ſeed-bud, a very ſhort ſhaft with three ſtigmas; and laſtly, a three-cornered ſeed. Some of theſe have but one ſpike, others have many, compoſed of fertile and barren flowers promiſcuouſly; but they are more uſually found on diſtinct ſpikes. In the latter diviſion is one ſpecies, of which the upright ſpikes grow together by threes, the barren one terminating,

* Chara. † Carex.

and the two lower fertile ones being almoſt black; a little leaf, longer than the ſpike, grows beneath the lower one, the bright green leaves are long and narrow, and the ſtem is a naked ſtraw with three equal flat ſides; by means of this plant, boggy moſſes are converted into firm uſeful land. The Burreed* and the Reedmace† have a near affinity to each other. In the firſt, the flowers of both kinds grow in a roundiſh head; the barren ones above, and thoſe with pointals beneath; each has a ſimilar empalement, conſiſting of three leaves, the ſummits are two, and the ſeed is as hard as bone. Neither of theſe plants has any corolla; the catkin, in the Reedmace, is formed like a cylinder, cloſe ſet with flowers on both kinds, arranged in the ſame order as thoſe of the Burreed; the cup of the ſtamineferous flowers has three briſtle-ſhaped leaves, but that of the piſtilliferous ones, only feathered hairs, and a ſingle ſeed ſupported in a kind of briſtle. The greater Burreed has upright, three-cornered leaves, but thoſe of the ſmaller kind are drooping and flat; the Great Catſtail, or Reedmace, reaches to the height of ſix feet; the leaves are very long and narrow, and ſword-ſhaped; the two ſpikes grow near together; but, in the leſſer kind, they are more diſtant, and the leaves are ſemicylindrical. In the fourth

* Sparganium. † Typha.

fourth order, Tetandria, you will find Roman Nettle*; the ſtameniferous flowers have a cup of four leaves; inſtead of the petals, a honey-cup is placed in the centre of the flowers; the piſtilliferous flowers are not always on the ſame plant, but are ſometimes ſeen on diſtant ones; they have a cup formed of two valves, which cloſing, ſupplies the place of a ſeed veſſel; they have no corolla. The diſagreeable effect of the ſtings you have doubtleſs felt; let them make you amends, by amuſing you in the microſcope; in ſhape, they reſemble the ſtings of inſects, long, tapering, and finely pointed. Notwithſtanding their minuteneſs, they are hollow, and convey a poiſonous fluid, which lurks in a ſmall bag at the baſe of the ſting: upon the ſting meeting with reſiſtance, it preſſes upon the little bag, and acts like a ſyringe. Both kinds of flowers proceed in bunches together, from the buds of the Box Tree †, thoſe which are barren, have a cup of three leaves, a corolla of two petals, and the rudiment of a ſeed-bud, without either ſhaft or ſummit; the fertile flowers have a four-leaved calyx, a three-petalled corolla, three pointals, and a three-celled capſule, with three bills, opening as a ſpring three ways, each cell containing two ſeeds; the bloſſoms are greeniſh, and the leaves oval, thick, and gloſſy, and, by their dura-

* Urtica. † Buxus.

tion through the winter, contribute to the beauty of plantations and pleasure grounds in that dreary season. There are many varieties, but they all belong to one species. The Birch* produces each kind of flowers in several catkins, which are composed of scales; those which are stameniferous have three flowers in each scale, the flowers consist of three equal florets, with four small clefts. The pistilliferous catkins have only two flowers in each scale, without any perceptible corolla; but these are succeeded by seeds bordered by a membrane. The Alder is of the same genus, and differs from the common Birch in its branched fruit-stalks, and round clammy notched leaves; whereas, those of the Birch are egg-shaped, tapering to a point, and the bark is white, smooth, and glossy. Several stately trees are included in the eighth order, Polyandria; the Oak, the Beech, the Hazel, and the Hornbeam. The Oak †, so valuable for its timber, and the various useful purposes to which its different parts are applied, claims precedency. The barren flowers hang upon a loose catkin, their calyx is of one leaf, blossom they have none; the number of the stamens is from five to ten; the calyx of the fertile flowers, which are seated in a bud, is like leather, and consists of one leaf; they have one pointal split into five parts, the seed is an oval

* Betula. † Quercus.

oval nut, called an acorn, covered with a tough ſhell, and fixed into the cup. The barren flowers of the *Beech** are fixed to a common receptacle, ſomewhat like a catkin; they have a bell-ſhaped calyx of one leaf, but divided into five clefts; the ſtamens are about twelve: the fertile flowers grow from buds on the ſame tree, and have a calyx with four teeth and three pointals; the calyx becomes a capſule beſet with ſoft thorns, containing two nuts. The Cheſnut is a ſpecies of the Beech, diſtinguiſhed by ſpear-ſhaped leaves, a little notched at the edges, and ſmooth underneath. But the Common Beech has egg-ſhaped leaves, indiſtinctly notched, and a ſmooth, white bark, the barren catkins round like a ball. As in ſeveral preceding genera, the barren flowers in the Hazel †, are formed on a long cylindrical catkin, and the fertile ones at a diſtance from the others, ſitting incloſed in a bud on the ſame ſhrub; for the Hazel, Filbert, &c. do not rank with trees; the ſcales of the catkins bend inwards, with three clefts, each ſcale containing a ſingle flower, furniſhed generally with eight ſtamens; the calyx of the fertile flowers has two upright leaves, jagged at the edge, each flower has two very long, red ſhafts, with ſimple ſummits; the fruit is a nut, to which you are no ſtranger; neither ſort of flower

* Fagus. † Corylus.

has any corolla; the leaves of the Common Hazel are oval, pointed, toothed, and wrinkled; the catkins are green at firſt, but change to brown. In the Hornbeam*, the different ſorts of flowers are produced in different catkins; both have a ſingle flower in each ſcale: the number of ſtamens varies, but is generally about ten; the fertile flowers have two germs, each bearing two pointals; the catkins growing very large, incloſe the ſeed at the baſe of the ſcales; the leaves are wrinkled, oval, and pointed, and ſharply indented at the edges. In the order, Monadelphia, I ſhall remark only the Fir †, belonging to a natural family, called Cone-bearing Trees. The barren flowers are produced in bunches, and have many ſtamens united below into an upright pillar, but ſeparated at the top; the fertile flowers grow on a cone, two of them in each ſcale; they have no corolla, one pointal, and a nut enlarged by a membranaceous wing. In the broad-leaved trees, where the ſtamens and pointals are produced in ſeparate empalements, either on the ſame, or on diſtinct trees, the flowers come out before the leaves are fully expanded, that the leaves might not intercept the duſt of the anthers in its paſſage to the pointals, by which they are fertilized; but nature, ever an œconomiſt, makes no ſuch arrangement among

* Carpinus. † Pinus.

among thoſe trees which have narrow leaves; ſuch as the Fir or Yew. This is a remarkable inſtance of deſign, and clearly proves that all parts of creation, if properly obſerved would furniſh us with examples of the wiſdom of an infinite wiſe Creator, who not only formed every thing in the beginning, but has provided, in a wonderful manner, for their preſervation and increaſe. With this ſerious reflection I ſhall conclude, wiſhing you all kinds of happineſs.

FELICIA.

LETTER XXVI.

DEAR CONSTANCE, *Shrubbery, Auguſt* 17.

THE only diſtinction between the laſt claſs we have examined, and the twenty-ſecond, which we are going to inveſtigate, conſiſts in the diſpoſition of the reſpective kinds of flowers. In the former claſs, both kinds were produced on the ſame plant; but in this, Dioecia, they muſt be ſought for on different plants of the ſame ſpecies. This will coſt you ſome trouble, but we

may remember my mother's favourite maxim, that nothing is to be obtained without its proportion of labour. The Willow* belongs to the ſecond order; the number of ſtamens is not always the ſame in different ſpecies; in ſome there are three or five, of unequal length, and one kind produces complete flowers with the ſame empalement. Two is the number that diſtinguiſhes the order, and which generally prevails; the genus contains many ſpecies that concur in the following characters: each kind of flower grows on a ſcaled catkin, with a ſingle flower in each ſcale, which has no corolla; the barren flowers have a very ſmall cylindrical, honied gland, placed in their centre; in thoſe which are fertile is an egg-ſhaped ſeed-bud, tapering into a ſhaft, hardly diſtinct from the germ, and terminating into two cloven, upright ſummits; the capſule has one cell and two valves, and incloſes many ſmall ſeeds, crowned with a ſimple, hairy feather. The Common Willow being familiar to you, I ſhall paſs it by, and ſelect the round-leaved Willow for its ſingularity; moſt of the tribe flouriſh in moiſt, watery ſituations; but this ſpecies is found on mountains. Its leaves are ſmooth, entire, and egg-ſhaped, their upper ſurface is green and wrinkled, the under one is bluiſh, and covered with

* Salix.

with a network of veins, which are at firſt red, but afterwards become green. It is but a low ſhrub, and produces both flowers and leaves from the ſame bud. The fourth order preſents you with the Miſletoe*; the ſtameniferous flowers have a cup with four diviſions, to each one of which is fixed an anther without a filament; the piſtilliferous flowers moſtly grow oppoſite to the others, their cup conſiſts of four leaves, ſitting on the germ, they have no ſtyle, and the ſeed-veſſel is a globular one, called berry, containing a ſingle, heart-ſhaped ſeed; neither kind of flower has any corolla. The ſeeds of this plant are ſuppoſed to be propagated by birds, which ſwallow them whole, and drop them on the branches of trees, where they vegetate, by inſinuating the fibrous parts of their roots into the woody ſubſtance of the tree. The White Miſletoe is found upon Willows, Oaks, Hazels, Apple, and Pear Trees, but moſt frequently upon Crab Trees. It has ſpear-ſhaped, blunt leaves; a forked ſtem, the flowers are produced in ſpikes in the boſom of the leaves, the bloſſoms have a greeniſh hue, and the berries are white. The Hop† will afford us a ſpecimen of the fifth order: the barren flowers have a cup of five leaves; in the fertile ones, it is one-leafed, expanding in an oblique manner, and entire; each of

* Viſcum. † Humulus.

of theſe is furniſhed with two pointals and one ſeed, and the whole is incloſed within a leafy calyx; neither kind has any corolla: what is generally called a Hop is only a cluſter of many of theſe flowers. The only ſpecies known has toothed leaves, divided into lobes and climbing ſtems. The Poplar* is compriſed in the eighth order: both kinds of flowers grow on oblong catkins, conſiſting of ſcales, each ſcale incloſing a ſingle flower, and ragged at the edge; neither has any petals; both have a turban-ſhaped nectary, ending obliquely at the top in an egg-ſhaped border; the fertile flowers have ſcarcely any ſhaft, but the ſummit is divided into four clefts; the ſeed-veſſel is a capſule of two cells, containing many feathered ſeeds. The Great White Poplar, or Abele Tree, has circular leaves, cut angularly at the edges, and downy underneath. The leaves of the Trembling Poplar, or Aſpen Tree, reſemble thoſe of the laſt-mentioned kind, except in having ſmooth ſurfaces on both ſides; the leaf-ſtalks are long and flattened towards the ends, which cauſes the leaves to ſhake and vibrate with the ſmalleſt breeze. In ſlow ſtreams and wet ditches is found Frogbit†, which belongs to the ninth order: the barren flowers have a cup of three leaves, and a corolla of three petals, and grow by threes in a ſheath of two oblong leaves; the

* Populus. † Hydrocharis.

the nine ſtamens are in three rows, from the middlemoſt proceeds an awl-ſhaped, little pillar, reſembling a ſhaft; the other two rows are united at the baſe, and there is the rudiment of a ſeed-bud in the centre of the flower. Thoſe that are fertile grow ſolitarily, the cup and corolla are ſimilar to the ſame parts in the barren flowers; the ſeed-bud is beneath; there are ſix pointals, and the capſule reſembles leather, with ſix cells fixed with many ſmall, roundiſh ſeeds. There is but one known ſpecies, which has ſmooth, thick, kidney-ſhaped leaves with white bloſſoms. In the order Monadelphia, is the Juniper *, the barren flowers are borne upon a conical catkin, the ſcales of which ſerve the purpoſe of a calyx; they have three ſtamens but no corolla; in the fertile flowers, the calyx is permanent, and has three diviſions growing to the ſeed-bud, which is beneath; the corolla conſiſts of three petals, the pointals are three, the ſeed-veſſel is a berry containing three ſeeds, and marked in the lower part with three oppoſite tubercles, which were formerly the cup, and at the top by three little teeth, which were originally the petals. In the common kind, the ſharp-pointed leaves grow by threes, longer than the berry expanding; it will thrive in almoſt any ſoil, but, in ſome ſituations, dwindles to a mere ſhrub.

* Juniperus.

ſhrub. The melancholy Yew *, placed in church-yards, to give additional ſolemnity to thoſe repoſitories of the dead, has neither bloſſom nor empalement, unleſs we chuſe to call the bud by that name, which conſiſts of three or four leaves; the ſtamens are numerous, terminated by anthers with eight clefts: the fertile flowers have an egg-ſhaped germ, ending in a blunt ſtigma without any ſhaft, which is changed to a ſingular kind of berry, or rather ſucculent receptacle, open at the end, and of a red colour, having one oblong ſeed ſtanding out of the open end: the leaves of the common kind grow cloſe together, in a double row along the ſtem, like the back-bone of ſome fiſh, and, when freſh, are a fatal poiſon. The Pettigree † is of the fourteenth order, Syngeneſia, in which the calyx, bloſſom, and honey-cup are the ſame in both kinds of flowers; the firſt has ſix leaves, bloſſom there is none, but an egg-ſhaped, puffed up honey-cup, open at the rim, grows in the centre of the flower. The barren flowers have no filaments, but they have three anthers united together at the baſe, on the end of the honey-cup: the oblong germ, in the fertile flowers, is concealed within the honey-cup; they have one pointal, and a globular berry for a ſeed-veſſel, which contains two round ſeeds: the ſpecies called

* Taxus. † Ruſcus.

called Butcher's Broom, bears its flowers on the upper ſurface of the leaves, which are like thoſe of the Myrtle, except being ſtiff and prickly at the points; the bloſſoms are of a yellowiſh green, and the berries red. I become every day more impatient for your return, as the time appointed for it approaches. Mrs. Snelgrove intends that we ſhall apply very cloſely in the winter to drawing, that we may be qualified to delineate the botanical ſpecimens we ſhall collect the following ſummer, that, by combining two branches of our education, we may improve in both at the ſame time. Adieu!

FELICIA.

LETTER XXVII.

Shrubbery, Auguſt 25.

THE diſpoſition of the flowers, my dear Conſtance, is the circumſtance upon which the twenty-third order, Polygamia, depends; its chief characteriſtic is, that both complete flowers, and one or both ſorts of incomplete ones, are either

either produced on the ſame plant, or on different individuals of the ſame ſpecies. The firſt order contains thoſe plants that always produce flowers furniſhed with all the parts of fructification, as well as thoſe that are deficient in ſome of them, on the ſame individual. Two of the graſſes are included in this order; the calyx and corolla of Soft Graſs * are ſupplied by chaffy huſks of two valves, the perfect flowers have three ſtamens and two pointals, though they have but one ſeed: the barren flowers are ſmaller than the others, and are placed among them; they likewiſe have three ſtamens, but are without corolla, pointal, or ſeed. The huſks incloſe each two florets; thoſe which contain the perfect kind are without awns; but in the creeping ſpecies, the imperfect florets have jointed awns, and the huſks are ſmooth. The huſks are woolly in the Meadow Soft Graſs, and the barren florets have crooked awns. In the Hard Graſs † the complete flowers are lateral, and the barren ones grow between them; all three are incloſed in a very large huſk of two valves. The ſtamens are three, and the pointals two, in the perfect flowers: the ſame number of ſtamens prevails in thoſe flowers which are imperfect. The flowers of the Maple ‡ grow in bunches, the perfect ones towards the lower part, and the barren ones

* Holcus. † Ægilops. ‡ Acer.

ones near the end. They are ſimilar, with reſpect to the calyx, corolla, and ſtamens; the firſt is divided into five clefts, the ſecond conſiſts of five petals, and the ſtamens are eight in number; the complete flowers have beſides one pointal, and two roundiſh capſules united at the baſe, each terminating in a large membranaceous wing, and containing one ſeed. The leaves of the Sycamore, which is one ſpecies of the genus, are divided into five lobes, unequally notched, and the flowers hang in large bunches: the bark of the Common Maple is rough and furrowed, the leaves are cut into blunt lobes, with ſmaller indentures. In the Pellitory of the Wall*, the incomplete flowers are furniſhed with pointals, but are deficient in ſtamens; they are placed between thoſe that are perfect, within the ſame fence, which is flat and conſiſts of ſix leaves; the calyx of both kinds is four cleft, they have no corolla, one pointal, and one ſeed. There are four ſtamens in the perfect flowers. The common ſort is known by lance-ſhaped leaves, forked fruit-ſtalks, and cups with two leaves: the flowers that are imperfect are four-edged and pyramidal. The Aſh† belongs to the ſecond order: it frequently happens that the ſame tree produces complete flowers, accompanied by thoſe which are piſtilliferous or ſtameniferous, but

* Parietaria. † Fraxinus.

but the former are generally upon a diſtinct tree; they have either no calyx, or one with four clefts; no corolla, or one with four petals; the pointal is one, and the ſtamens two, in the complete flowers, with one flat, ſpear-ſhaped ſeed; the Common Aſh has winged leaves, ſlightly notched, the ſide buds ſend forth flowers, the terminating ones leaves, the piſtilliferous flowers are without either petals or empalement.

With great affection to all our friends that are with you, I conclude truly your's,

FELICIA.

LETTER XXVIII.

Shrubbery, September 10.

WE are at length arrived, my dear Conſtance, at the laſt claſs, Cryptogamia, which I have already told you, includes thoſe vegetables which are of the loweſt kinds, whoſe parts of fructification have hitherto eſcaped the moſt attentive reſearches of learned botaniſts; therefore, Mrs. Snelgrove has recommended only a very few of the

the moſt obnoxious to my notice, which, ſhe ſays, may ſerve to give us general ideas of the reſt. The parts of fructification in the Ferns are ſometimes produced in ſpikes, but in general they are found upon the backs of the leaves, and, when magnified, appear to conſiſt of a ſcale proceeding from the leaf, with an opening on one ſide; ſome little globules lie concealed beneath this ſcale, ſupported on foot-ſtalks and ſurrounded by an elaſtic ring; when the ſeed is ready for diſperſion, theſe balls burſt, and there iſſues a fine powder from them, which is believed to be the ſeed. Horſetail *, Adderſtongue †, and Moonwort ‡, have their fructification upon ſpikes; each ſeparate one belonging to the firſt, is found and gaping at its baſe, compoſed of many valves. That ſpecies, which is found in moiſt, corn fields, bears its fruit upon a naked ſtalk; other leafy ſtalks, that are barren, come up later, and continue after the firſt are ſhrivelled. The rough, naked ſtem of the Shave Graſs, is uſed by turners and cabinet-makers to give their work a poliſh. The capſules in Adderſtongue point along both ſides of the ſpike in a jointed row, which is divided into as many cells as there are joints; theſe cells, when the ſeeds are ripe, open croſſways. The common ſpecies is diſtinguiſhed by an egg-ſhaped leaf, and a very ſlender ſpike

* Equiſetum. † Ophioglooſſum. ‡ Oſmunda.

ſpike growing on a fruit-ſtalk. Moonwort has globular capſules diſpoſed in a bunch; the ſeeds are very ſmall and numerous. The common ſort grows in hilly paſtures; it has a ſolitary, naked ſtem, and one winged leaf. The Oſmund Royal is found in putrid marſhes, its leaves are doubly winged, and bear bunches of flowers at the ends. Ruſtyback * has the whole under ſurface of the leaves covered with the fructification. In the various ſpecies of Polypody †, each fructification forms a diſtinct, round dot, placed on the under ſurface of the leaf. There are many ſpecies, generally known by the name of Ferns; that which occurs moſt commonly is called Male Fern, and is found in woods, heaths, and ſtony places; it has a chaffy ſtem, the leaves are doubly winged, the wings blunt and a little ſcolloped. Spleenwort ‡ produces its fructifications in ſtraight lines. Hartſtongue has entire ſimple leaves, reſembling the form of a tongue, with hairy ſtalks; it grows on moiſt, ſhady rocks. In Maidenhair § the flowers are diſpoſed in oval ſpots, towards the ends of the leaves, which are turned back upon them. The true Maidenhair has leaves which are doubly compound, the little leaves alternate, the wings are ſhaped like a wedge, divided into lobes, and grow upon foot-ſtalks. Let us now proceed to the Moſſes, which differ

* Acroſtichum. † Polypodium. ‡ Aſplenium. § Adiantum.

differ from the Ferns, in having leaves diſtinct from the ſtalk; from the midſt of theſe leaves are ſeen ſmall threads, terminated by a ſmall body, the whole correſponding with ſtamens; ſhorter threads, ſuppoſed to be pointals, ſometimes grow on the ſame plant, and ſometimes upon a diſtinct one; the tips of the longer threads have been diſcovered to be capſules: in ſome genera, they are covered with a veil or cap; in others, they are without this defence; which diſtinction ſerves as a diviſion to the order. Moſſes, though apparently inſignificant, are not uſeleſs; they protect the roots of tender plants equally from the extremes of cold and heat; and many kinds of them, by vegetating in the ſhallow parts of pools and marſhes, convert, in the courſe of a long period of time, that ſpace, which before was only water and bog, into uſeful land and fruitful paſtures. Neither Clubmoſs *, Bogmoſs †, or Earthmoſs ‡, has any veil; the firſt has a two-valved capſule, ſitting at the baſe of the leaves; the ſecond has a ſmooth mouth, and the capſule covered with a lid; and the third is known by its fringed mouth, covered with a lid tapering to a point. Hairmoſs § has a capſule covered with a conical lid, ſitting upon a ſmall riſing eminence, which ſupplies the place of a receptacle, a woolly veil protects

* Lycopodium. † Sphagnum. ‡ Phaſcum § Polytrichum.

protects this capsule; the fertile flower is supposed to grow on a distinct individual, under the form of a little rose or star. The Great Golden Maidenhair, the commonest species of this genus, has a simple stem, and the capsule is of a long, square shape. Marshmoss *, like Hairmoss, has two kinds of fructification; the one a capsule with a lid, covered with a smooth veil; the other composed of leaves, arranged in the form of a star or rose, with many dusty, globular particles collected into a ball in the centre. None of these fertile flowers, as they are imagined to be, are found in either Threadmoss † or Feathermoss ‡, but they both have a lidded capsule, covered with a smooth veil. Bryum, or Threadmoss, is distinguished by a naked stalk, and a tubercle at the base of it; whereas the fruit-stalks, in the Hypnum or Feathermoss, rise from the side of the shoots, and their base is surrounded by a scaly bulb. There is one species of Threadmoss that is a great preservative to thatch; it has nearly upright lips and reflected leaves, which terminate in hoary hairs; happy is it for the cottager, when this moss takes to vegetate on the roof of his humble dwelling; it forms a defence against the injuries of weather, that will last for many years. The Fern Feathermoss is diminutive, but extremely elegant; it grows in shady places

or

* Mnium. § Bryum. ‡ Hypnum.

or upon the banks of ditches; the fruit-ſtalks riſe from the end. The wings are ſimple, though winged; the tips are creſted with a lid of a lively red, and the mouth edged with a fringe of the ſame colour. The Sea Weeds and Liverworts are included in the third order; ſome people call them Thongs, becauſe the ſubſtance of many of them reſembles leather; the parts of their fructification are too little known, to ſupply a regular account of them; for they ſcarcely admit of a diſtinction of root, leaf, or ſtem; much leſs can we form a preciſe idea of the more minute parts of the flower; there are ſmall bodies perceptible in the Liverworts, which are conjectured to be the reſpective kinds of flowers, diſtinct from each other; the fruit and flowers in the Sea Weeds are ſuppoſed to conſiſt of little bladders, ſome of which are hollow, and contain hairs within them; others are filled with a kind of jelly. As theſe matters are not yet ſufficiently aſcertained, to produce a certainty, we muſt wait patiently till further experiments of naturaliſts throw more light upon the ſubject. Many of theſe are uſeful in commencing the operations of nature, in the growth of vegetables upon the bareſt rocks, receiving no other ſupport than what the air and rain afford them; as they decay, they are converted into a very fine mould, which nouriſhes other ſpecies; theſe,

theſe, in their turn, are changed into food for Moſſes, &c. and they likewiſe rot, and, in length of time, a ſoil is formed from the refuſe of the whole, capable of maintaining trees, plants, &c. The Lichens, or Liverworts, ſpread themſelves like meal, cruſt, leaf, or thread over the ground, rocks, plants, or trees; and, being very numerous, are ſubdivided, according to the various peculiarities of the receptacle, and manner of growth; this genus has a roundiſh, flat, ſhining, gummy receptacle, and the leaves are covered with a meal or duſt. The firſt ſection is tubercled; they adhere cloſely to the bark of trees, in the form of a cruſt, ſtudded with convex receptacles or tubercles, which are frequently thought to reſemble the lines in writing or maps. The ſecond is the ſaucer-like, becauſe the cruſt is ſprinkled with hollow receptacles, ſomewhat like ſaucers. Thirdly, the tiled, are compoſed of many ſmall leaves growing circularly, the ſmalleſt in the middle, and thoſe which are largeſt on the outſide. Fourthly, the leafy is diſtinguiſhed by leaves that are detached from the ſubſtance upon which they grow, and are jagged or torn in various directions. The ſaucers, or ſhields, are large, and frequently grow on fruit-ſtalks, either in the diviſions of the leaves, or upon their edges. There is one ſpecies that is rather upright and leafy, it is white and downy underneath, and

branched

branched like the horns of a ſtag, which has an extraordinary capacity of imbibing and retaining odours, and on that account is uſeful to the perfumers, as a baſis for ſcented powders. Fifthly, Leatherlike: the leaves of this diviſion reſemble leather in ſubſtance; the ſhields, which are large, are moſtly found upon the edges of the leaves. Sixthly, Sooty, appearing black as if burnt, and adhering only in one point to the ſubſtance upon which they grow. Seventhly, Cup-bearing, conſiſting at firſt of a granulous cruſt, which afterwards unfolds into ſmall leaves; from theſe ariſes a ſtem, ſupporting the receptacles, which are formed like a cup or drinking-glaſs; upon the edges of theſe cups are frequently ſeen little brown or ſcarlet tubercles. Eighthly, Shrubby, branching out like ſhrubs or coral. The celebrated Rein Deer Moſs belongs to this diviſion: it is perforated, much branched, the ſmaller branches nodding. This is almoſt the only vegetable to be found in the inhoſpitable climate of Lapland, during the dreary ſeaſon of winter; but it makes amends for the want of others, by ſupporting the Rein Deer, an animal, which not only affords food to the Laplander, but ſupplies him with every neceſſary of life. Ninthly, Thread-like: the branches ſhooting out like ſo many threads, moſtly from the branches of trees, which gives this kind the name of Treemoſs. It is high

time to proceed to the Sea Weeds, which are compriſed in the three following genera, Laver*: Oarweed†, and Riverweed‡. The ſubſtance of the firſt of theſe plants is membranaceous, and the parts of the fructification are incloſed in a membrane, rather tranſparent and like a bladder. The Oarweed, Sea-weed, or Sea-wrack, as it is ſometimes called, is leathery, and has two kinds of bladders, one of which is ſmooth and hollow, and interwoven with hairs, and is eſteemed to be the barren flowers; the others, regarded as the fertile flowers, are filled with a kind of jelly, which contains ſmall perforated grains, in each of which is a ſolitary ſeed. The Riverweeds are compoſed of unequal tubercles, growing on very long hair-like fibres. We are not likely to examine many of the two laſt genera, unleſs we ſhall be able to perſuade my mother to make an excurſion to the ſea ſide, as moſt of them are found on the ſea ſhore, or in rivers and ſlow ſtreams. There remains now only the Muſhrooms, or Fungi, to ſpeak of, which you know at firſt ſight, from the ſingularity of their appearance, being deſtitute of either branches, leaves, flowers, or any thing ſimilar to the parts of fructification in other vegetables. The Muſhroom§, a very extenſive genus, grows horizontally, and is furniſhed with gills on the under ſurface; that

* Ulva. † Fucus. ‡ Conferva. § Agaricus.

that ſpecies of it, which is common at the tables of the opulent, and valued for its high flavour, has a convex, ſcaly white head, which is ſupported on a ſtalk or pillar, and the gills are red; it grows in woods or parks, where the land has been long unploughed. The Spunk* is another genus which grows horizontally, but differs from the laſt, in having pores inſtead of gills on the under ſurface. The Morell† is known by a ſmooth ſurface underneath, and a kind of network on the upper part. That which is eaten has a naked, wrinkled pillar, and a hat that is egg-ſhaped and full of cells: Puffball‡ is a Fungus of a roundiſh form, and filled with a mealy powder, ſuppoſed to be the ſeeds. The Truffle uſed for food has no root, but grows beneath the ſurface of the ground; it is round and ſolid, the outſide is rough. The method of finding this ſubterraneous delicacy, is by dogs, which are taught to hunt for it by ſcent; as ſoon as they perceive it, they begin to bark and ſcratch up the ground, a ſure indication to their employers, that the treaſure they are in ſearch of is at hand. The propenſities and inſtincts of animals, is an inexhauſtible ſource of wonders to thoſe who are acquainted with them. The ſtructure of plants has furniſhed us with much ſubject of admiration, from the ſlight ſurvey only

* Boletus. † Phallus. ‡ Lycoperdon.

that we have taken of them, which ſurely ſhould excite us to obſerve them with further attention, as leiſure and opportunity offer.

Thus, my dear ſiſter, I have gone through all the claſſes, ſuperficially indeed, but perhaps ſufficiently diffuſe, to give you a taſte for my favourite purſuit, which is every thing I had in view when I began this correſpondence, to which your return next week will put an agreeable termination; I ſhall rejoice to reſign my office of inſtructreſs to my dear Mrs. Snelgrove, who unites with my mother and me, in impatiently wiſhing for the day, t hat ſhall reſtore my belov-Conſtance to her affectionate

FELICIA.

PLATE


Fig. 1


Fig. 4


Fig 2


Fig 3


Fig 5

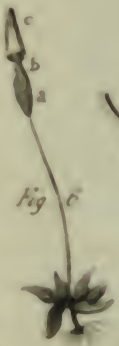
Fig 6


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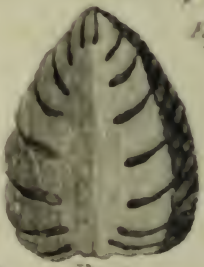
Fig. 9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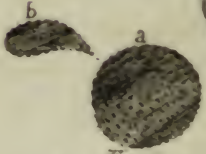
Fig. 11


Fig. 12


Fig. 13

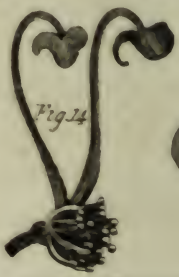
Fig 14


Fig 15

PLATE I.

EMPALEMENTS, or Parts of Flowers, Letter.

PLATE II.

Fig. 1. Calyx or Cup, as in the Polyanthus.

Fig. 2. Involucrum; a Fence or Univerſal Umbel; *a*, general; *b*, partial.

Fig. 3. Amentum or Catkin.

Fig. 4. A Spatha or Sheath.

Fig. 5. A Glume, Calyx, or Huſk; *c c* the Valves; *d d*, the Awns.

Fig. 6. A Veil, as in *Moſſes*; *a*, Capitulum or Head; *b*, the Operculum or Lid; *c*, Calyptre, Hood or Extinguiſher.

Fig. 7. A Cap, as in *Muſhrooms*; *a*, Cap or Hat, *b*, Valve; *c*, Stripe of a *Fungus*.

Fig. 8. *a*, The Receptacle of a compound Flower, not Chaffy.

Fig. 9. A Spatha and Spadix.

Fig. 10. Strobilus, a Cone; a Pericarpium formed from an Amentum or Catkin as Fig. 3.

Fig. 11. *a*, The Pollen, viewed with a Microſcope; *b*, an elaſtic Vapour diſcharged from it.

HONEY-CUPS.

Fig. 12. A Bell-ſhaped Honey-cup which crowns the corolla, as in the *Narciſſus a*, the Cup or Nectarium.

Fig. 13. Nectaries in the *Parnaſſus*: thirteen between each Stamen.

Fig. 14. The horned Honey-cups of the Aconite.

Fig. 15. The Scale or Honey-cup at the bottom of the Petal of the Crown Imperial.

PLATE III.

BLOSSOMS.

Fig. 1. A Bell-ſhaped Bloſſom.
Fig. 2. A Funnel-ſhaped Bloſſom.
Fig. 3. A Ringent Bloſſom.
Fig. 4. A Perſonate Bloſſom.
Fig. 5. A Cruciform Bloſſom.
Fig. 6. A Butterfly-ſhaped Bloſſom.
Fig. 7. A Compound Radiate Flower.

FOLIATION.

By this term we underſtand the ſtate the Leaves are in, whilſt they remain concealed with the *Buds* of the Plant. Linnæus claims the diſcovery of theſe diſtinctions, preceding Botaniſts not having attended to the *complicate*, or folded ſtate of the Leaves, which are in their manner, either, as

Fig 8. Convolute, *rolled together*; when the margin of one ſide ſurrounds the other margin of the ſame Leaf, in the manner of a Cowl or Hood, as in Indian Flowering Reed, Saxifrage, and many Graſſes.

Fig. 9. Involute, *rolled in*; when their lateral margins are rolled ſpirally inwards, as in the Poplar, Pear, Violet, &c. &c.

Fig.


Fig. 1


Fig. 2


Fig. 3


Fig. 4


Fig. 6


Fig. 5


Fig. 7


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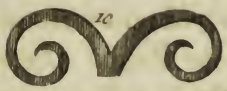
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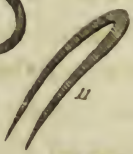
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Fig. 10. Revolute, *rolled back*; when their lateral margins are rolled ſpirally backwards, as in Roſemary, Foxglove, Coltsfoot, &c. &c.

Fig. 11. Conduplicate, *doubled together*; when the ſides of the Leaf are parallel and approach each other, as in Oak, Beech, Walnut, &c. &c.

Fig. 12. Equitant, *riding*; when the ſides of the Leaves lie parallel, and approach in ſuch a manner, as the outer embrace the inner, as in Flower de Luce, Sweet Ruſh, and ſome Graſſes.

Fig. 13. *Imbricated*; when the Leaves are *parallel* with a ſtraight ſurface, and lie one over the other, as in Lilac, Privet, Croſſwort, &c.

Fig. 14. Obvolute, *rolled againſt* each other; when their reſpective margins alternately embrace the ſtraight margin of the oppoſite Leaf, as in the Pink, Campion, Valerian, &c.

Fig. 15. Plaited; when their complication is in plaits lengthways, like plicate Leaves, as in the Maple, Marſh Mallow, Vine, &c.

Fig. 16. Convolute, ſee Fig. 8; more than one Leaf convoluted.

Fig. 17. Involute, oppoſite.
Fig. 18. Involute, alternate. } See Involute.

Fig. 19. Revolute, oppoſite. See Fig. 10.

Fig. 20. Equitant, two edged; Equitant two prominent Angles. See the difference in Fig. 12, which has not thoſe Angles.

Fig 21. Equitant, three ſided; Equitant, three ways, ſo as to form a triangle.

PLATE IV.

CLASSES, to face Letter VII.

PLATE V.

SEED-VESSELS.

Fig. 1. The Capſule of a *Poppy*; *m*, the radiate ſummit; *n*, the whole through which the ſeeds eſcape.

Fig. 2. A Shell or Legumen, in which the ſeeds are fixed to the upper ſeam only.

Fig. 3. A Pod or Siliqua, in which the ſeeds are fixed to the ſeam alternately.

Fig. 4. A Berry (Baccha) cut acroſs, to ſhew the ſeeds.

Fig. 5. A Fleſhy Capſule or Pear; *a*, the Pome or Pulp; *b*, the Capſule included; *c*, one of the Seeds raiſed.

Fig. 6. A Pulpy Seed-veſſel; Drupa or Stone-fruit; *a*, the Pulp or Drupa; *b*, the Nucleus or Stone.

Fig. 7. A Capſule gaping at top.

Fig. 8. A Capſule longitudinally diſſected, that the Receptacle of the Seeds may appear.

Fig. 9. Of the Parts of a Capſule; *a*, the Valvalet; *b*, the Partition; *c*, the Column or Pillar; *d*, Receptacle.

Fig. 10. A winged Seed; *o*, the hairy Pappus; *p*, the Feathery Pappus; *q*, Seed; *r*, Stipe of the Pappus.

Fig. 11. A Folliculus or little bag; *ſ*, a Receptacle of Seeds.

PLATE

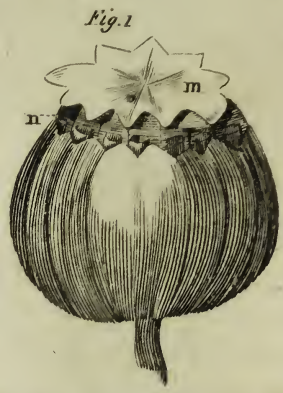
Fig. 1
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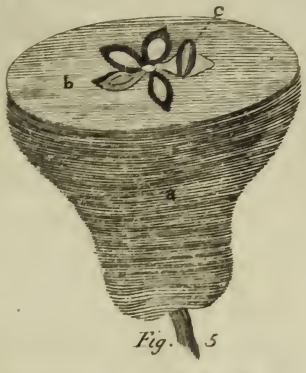
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Fig. 5


g. 2


Fig. 4


Fig. 3


Fig. 7


Fig. 8

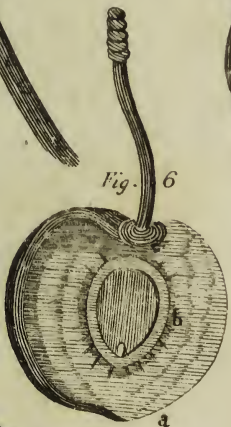
Fig. 6
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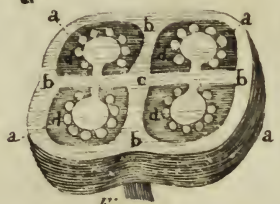
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Fig. 9

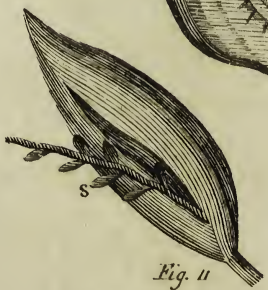
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Fig. 11


o
P
Fig. 10
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Fig. 1

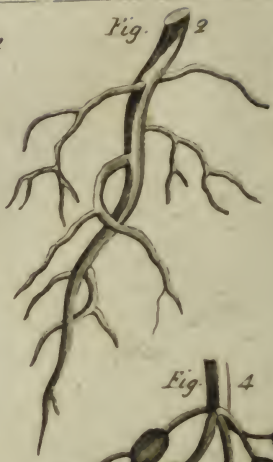

Fig. 2

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PLATE VI.

ROOTS.

Fig. 1. A Spindle-ſhaped Root.
Fig. 2. A Branching or Fibrous Root.
Fig. 3. A coated Bulbous Root cut acroſs to ſhow the coats that compoſe it.
Fig. 4. A Tuberous Root.
Fig. 5. A Repent or Creeping Root.
Fig. 6. A ſolid Bulb.
Fig. 7. A ſcaly Bulb.
Fig. 8. A granulous Root.
Fig. 9. A jointed Root.

PLATE VII.

FRUIT-STALKS AND MODES OF FLOWERING.

Fig. 1. A Stalk that ſupports the Flower, and riſes directly from the Root.
Fig. 2. A Corymbus or broad Spike, as in Gold of Pleaſure.
Fig. 3. A Spike.
Fig. 4. Verticillus or Whorls, as in Horehound, Mint, &c.; *a a*, the Whorls.
Fig. 5. A Racemus or Bunch, as in Currants.
Fig. 6. A Faſiculus or Bundle, as in the Sweet William.
Fig. 7. A Panicle.

Fig. 8. A Thyrſus, exemplified in the Butter-bur.

Fig. 9. An Aggregate Flower, ſhown in the Scabioſa.

PLATE VIII. AND IX.

LEAVES.

Fig. 1. Round.
Fig. 2. Circular.
Fig. 3. Egg-ſhaped.
Fig. 4. Oval.
Fig. 5. Oblong.
Fig. 6. Spear-ſhaped.
Fig. 7. Strap-ſhaped.
Fig. 8. Awl-ſhaped.
Fig. 9. Kidney-ſhaped.
Fig. 10. Heart-ſhaped.
Fig. 11. Creſcent-ſhaped.
Fig. 12. Triangular.
Fig. 13. Arrow-ſhaped.
Fig. 14. Halbert-ſhaped.
Fig. 15. Divided or Cleft.
Fig. 16. Compoſed of three Lobes.
Fig. 17. Divided to the mid rib.
Fig. 18. With five Angles.
Fig. 19. Hand-ſhaped.
Fig. 20. With winged Clefts.
Fig. 21. Ditto jagged.
Fig. 22. Parted.
Fig. 23. Tooth-like.

Fig.


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PLATE. IX

Fig. 24. Indentments.
Fig. 25. Serrated or Sawed.
Fig. 26. Ending ſharp or tapering.
Fig. 27. ——— ſharply nicked.
Fig. 28. Wedge.
Fig. 29. Wrinkled.
Fig. 30. Veined.
Fig. 31. Tongue-ſhaped.
Fig. 32. Scimetar-ſhaped.
Fig. 33. Hatched-ſhaped.
Fig. 34. Deltoid, like the old Greek Delta.
Fig. 45. Three-ſided.
Fig. 36. Channelled.
Fig. 37. Furrowed.
Fig. 38. Cylindrical.
Fig. 39. Finger-ſhaped, of two.
Fig. 40. Growing by three on leaf-ſtalks.
Fig. 41. Winged, terminated by an odd one.
Fig. 42. ———, abruptly.
Fig. 43. ———, alternately.
Fig. 44. ———, tendrilled.
Fig. 45. ———, jointedly.
Fig. 46. Lyre-ſhaped.
Fig. 47. Doubly-winged.
Fig. 48. Doubly three-leaved.
Fig. 49. Triply three-leaved.
Fig. 50. Thrice feathered, abruptly terminated.
Fig. 51. Ditto, with an odd one.
Fig. 52. Plaited.

PLATE

PLATE X. AND XI.

DETERMINATE LEAVES, STEMS, SUPPORTS, &c.

Fig. 1. *a*, *Inflected*, bent inwards; when the Leaf is turned upwards towards the Stem.

b, *Erect*, upright; when the angle they form with the Stem is very ſmall.

c, *Spreading* or *Expanding*, patent; when they make an acute angle with the Stem.

d, *Horizontal*; when they ſtand at right angles with the Stem.

e, *Reclined*, reflex; when they are bowed downwards, ſo that the Apex or Tip is lower than the Baſe.

f, *Revolute*, rolled back, and downwards.

Fig. 2. *g*, *Sentinal*, Seed Leaves; which before were the Cotyledons, and are the firſt which appear.

h, *Cauline*, Stem Leaves, ſuch as grow round the Stem.

i, *Rameous*, Branch Leaves.

k, *Floral*, Flower Leaves: ſuch as are placed at the coming out of the Flower.

Fig. 3. *l*, *Peltated*, or Shield-faſhioned; a Leaf which has the foot-ſtalk inſerted into the centre of the lower diſk, or ſurface,

Fig. 1

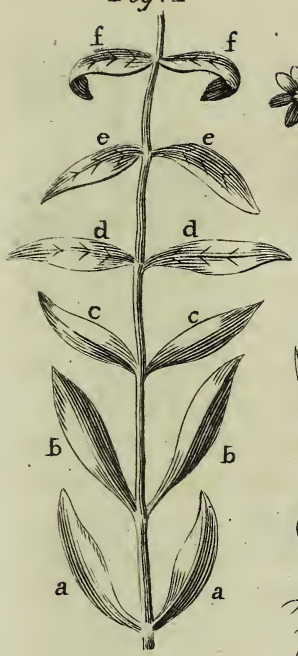

Fig. 2

Fig. 3

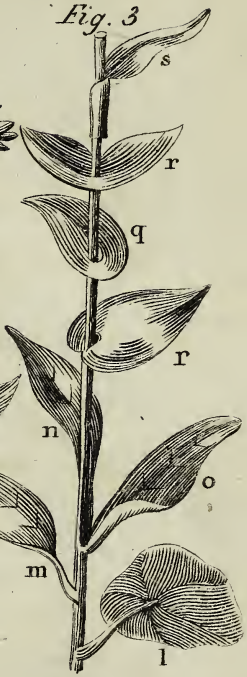

Fig. 4

Fig. 5

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PLATE XI.

Fig. 9

Fig. 10

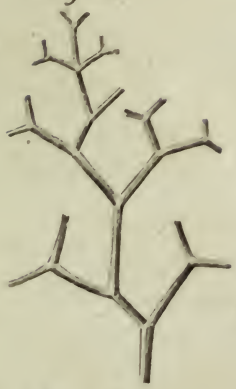

Fig. 11

Fig. 12

Fig 13

Fig. 14

Fig. 15

Fig 16

Fig. 17

face, as in the Water Lily, Jack in a Box, &c.

m, *Petiolated*; when there is a Petiole faſtened to the leaf at the margin of the baſe.

n, *Decurrent*, running down; when the baſe of a Seſſile Leaf, extends itſelf downwards along the Stem, beyond the proper baſe or termination of the Leaf, as in the Thiſtle Globe Flower.

o, *Seſſile*, ſquat; when the Leaf has no Petiole, but is faſtened immediately to the Stem.

p, *Amplexicaul*, embracing the Stalk; when the baſe of the Leaf embraces the Stem croſſways on both ſides, or *ſemiamplexicaul*, half embracing the Stalk, which only differs from the amplexicaul in that it is in a leſs degree.

q, *Perfoliate*, Leaf-pierced; is when the baſe of the Leaf is continued acroſs the Stem, till it meet again, ſo as to furround it.

r, *Connate*, growing together; when two oppoſite Leaves join, and are united into one, as in Hemp, Agrimony.

ſ, *Vaginant*, forming a Vagina or ſheath; when the baſe of the Leaf forms a cylindric

cylindric tube that inveſts the branch. This is alſo called a Glove-embracing Leaf, as it goes round the Stem and ſhoots from the middle.

Fig. 4. *t*, *Articulated*, jointed; when one Leaf grows out at the top of the other.

u, *Stellate*, Starry or Verticillate, whorled; when the Stalk is ſurrounded in whorls by more than two Leaves: and theſe again receive the denomination of Tern, Quatern, Quina, Sena, &c. according to the number of Leaves of which the Star or whorl is compoſed, as in African Almond, Roſebay, &c.

w, *Quatern*, fourfold. See the laſt Definition.

x, *Oppoſite*; when the Cauline Leaves come out in pairs facing each other, and ſometimes each pair is croſſed by the next, ſo that they point four different ways.

y, *Alternate*; when they come out ſingly, and follow in gradual order.

z, *Aceroſe*, Awny, Chaffy; when it is linear and perſiſting, a. in Pine Tree, and Juniper.

a, *Imbricated*; when they lie over each other like the tiles of a houſe.

b, *Faſciculated*,

b, *Faſciculated*, bundled: when many come from the ſame point, as in the Larch Tree.

Fig. 5. *Spatulated*, reſembling a Spatula; when the figure is roundiſh, but lengthened out by the addition of a linear baſe that is narrower.

Fig. 6. *c*, *Squamoſa Culm*, or Straw; when it is covered with imbricate ſcales.

d, *Repent*, creeping; when by lying upon the ground, or touching a tree, wall, &c. they put forth roots at certain intervals, as in Ivy, Trumpet Flower, &c.

Fig. 7. *Frons*. Frond is a ſpecies of Trunk compoſed of a Branch and a Leaf blended together, and is frequently united with the fructification; it belongs to Palms, &c.

Fig. 8. *Articulate*, jointed Straw or Culm; when they are diſtinguiſhed from ſpace to ſpace by knots or joints.

Fig. 9. *Volubiles*, twining; when they aſcend ſpirally, by the branch of ſome other plant. Theſe wind either to the left, according to the motion of the ſun (as it is commonly phraſed) as in Hops, Honeyſuckle, &c. or to the right, contrary to the ſun's motion, as in Bindweed,

Bindweed, Malabar, Nightſhade, Kidney Bean, &c.

Fig. 10. *Dichotomous*, forked; when the diviſion is always in two parts.

Fig. 11. *Brachiatus*, having Arms; when the branches are oppoſite, and each pair is croſſed by the pair above or below it.

Fig. 12. *e e*, *Bracteæ*, Floral Leaves; differing in ſhape and colour from the reſt, as in the Lime Tree, Fumitory, &c.

f f, The common Leaves.

Fig. 13. *Pedicled Glands*; borne on Pedicles, *g g*.

Fig. 14. *Tendril* or Claſper; *h*, is a filiform ſpiral band, by which a plant faſtens itſelf to any other body, as in the Vine, Heart Pea, and Trumpet Flower.

i, *Concave Glands*, are either Petiolar, when they are on the Petioles, as in the Palma Chriſti, Paſſion Flower, Senſitive Plant, &c.

Foliaceous; when they are produced from the Leaves, and theſe are from the Serratures, as in the Willow; from the Baſe, as in the Peach, Gourd, &c. from the Back, as in the Tamariſk;

Tamariſk; or from the ſurface, as in the Butterwort, Sundew, &c.

Stipular, when they are produced from Stipula, as in Mountain, Ebony, &c.

Capillary, like hairs, as in the Currant Tree, Snap Dragon, &c.

Pores only, as in the Tamarind Tree, and Viſcous Campion.

k, *Stipula*, is a ſcale or ſmall Leaf, ſtationed on each ſide of the baſe of the Petioles or Peduncles when they are firſt appearing, as in the Papilionaceous Flowers; alſo, in the Tamarind Wild Cherry, Roſe, &c.

Fig. 15. *p p*, Oppoſite Leaves. See Fig. 4.

q q, *Axillary*, coming out from the Wings; that is, either between the Leaf and the Stem, or between the branch and the Stem.

Fig. 16. *n Aculeus*, a Prickle, is a kind of Armature, proceeding from the Cortex of the Plant only, as in the Roſe, Brambles, &c.

o, Triple Prickle or Fork.

Fig. 17. *l*, *Spina*, a Thorn, is a kind of ſharp weapon or armature, protruded from the

the wood of the plant, as in the Plum Tree, Buckthorn, &c. It will often disappear by culture, as in the Pear.

m, A Triple Spine.

FINIS.